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Original Contributions.

RELATIONS OF CHEMISTRY TO DENTISTRY.

BY DR. J. S. CASSIDY, COVINGTON, KY. READ BEFORE THE AMERICAN DENTAL ASSOCIATION, AT OLD POINT COMFORT, AUGUST, 1897.

Investigation of the laws which were supposed to govern observed natural phenomena was one of the favorite pursuits of learned men from the earliest historic times. Reasoning from effect to cause, as time progressed, led to many useful discoveries, probably in the same ratio to intelligence, and the laws of supply and demand, as obtains in the affairs of this day and age. The development of the ancient art of alchemy, along practical lines, was a leading civilizing influence on the people, as they gradually emerged from their simple surroundings into a clearer conception of the comforts which could be obtained from changing material bodies into more desirable or needed conditions. The inhabitants of the deserts of Lybia were, in the olden time, inadequately supplied with common salt; their alchemists accordingly manufactured a substitute from camel's dung and named it Sal Ammoniac—"Salt of Ammon"—in honor of Jupiter Ammon, whom they worshipped. Herein the Arab chemists exhibited a commendable commercial spirit; whereas their Greek and Roman contemporaries labored somewhat more in the field of pharmacy, by extracting from both mineral and vegetable sources numerous medicinal agents, thus in their practice balancing the mercenary by the professional spirit. Whatever of dentistry existed in those days must have partaken of the benefits derived from the important part played by alchemy in general therapeutics.

According to Dr. Ebers, many branches of science flourished wonderfully in ancient Egypt and were practiced by specialists of the priestly order. "Our physicians," said King Amasis to his visitor, Crœsus, "are permitted to treat only one part of the body. We have aurists, dentists and oculists, surgeons for fractures of the bone and others for internal diseases. By the ancient priestly law a dentist is not allowed to treat a deaf man, nor a surgeon for broken bones to treat a patient who is suffering from a disease of the bowels, even

kind. To chemistry our profession is indebted in that it prepared N_2O , by which means in after years Dr. Horace Wells, a dentist, might be permitted to introduce anesthesia, the greatest boon ever conferred on suffering humanity.

And here let me say, that it does not follow that a man must thoroughly understand every department of the noble science in order to appreciate truths in chemistry which may be daily useful to him in our profession. Even a limited knowledge of the principles of chemistry enables the operator to administer that gas intelligently, knowing that N_2O supersedes the normal process of oxidation in the body, and prevents the ready elimination of its products; inducing thus the anesthesia by rapid formation and retention of CO_2 ; which fact of itself suggests the proper remedies for overcoming the tendency to asphyxia, which necessarily follows the inhaling of gas.

Dentists, as a rule, are not indifferent to nor ignorant of chemical processes; notwithstanding our friend, Dr. Crouse, asserted there was not a single dentist in this country who could make an accurate quantitative analysis of any dental amalgam; whereas hundreds might be named who could do so, if it were necessary. Indeed, there are many men, not professional chemists, who are able to do excellent work along lines of chemical discovery and manipulation. The recent studies of the chemical and physical properties of amalgams are of inestimable value to every dentist who thankfully takes advantage of the information derived through the labors of Dr. Black.

Moreover, not to mention the innumerable pharmaceutical preparations, our zinc oxid cements may be brought in evidence; and as some of us are sure that fillings of these materials are disposed to disintegrate more at the cervical point than elsewhere, we also think we know the true and only cause of this unfortunate disposition, in that the part under or near the gum margin is a favorite point for alkaline fermentation, such as the production of ammonia, resulting in the inevitable abstraction by it of the electro-negative substance of the cement. Some may be inclined to consider this brief allusion to cause and effect as "only a fine spun theory," but it is not; it is as susceptible of proof as any problem in mathematics.

We cannot, as dentists, escape, even if we so desire, the claims of the science of chemistry upon our earnest attention and study, for on every hand we are compelled to admit the insidious influence of its affinities to be the exciting and efficient cause of the principal dis-

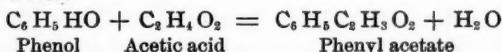
though he should have a first-rate knowledge of internal complaints. This law aims at securing a great deal of real and thorough knowledge—an aim, indeed, pursued with a most praiseworthy earnestness in all branches of science." "I came to Egypt," wrote the Sybarite, "to consult a dentist. That rude fellow, Aristomachus of Sparta, however, knocked out the defective tooth and so saved me from an operation, the thought of which had often made me tremble. On recovering consciousness, I found that three teeth had been knocked out of my mouth—the diseased one, and two others which, though healthy, would probably at some future time have caused me pain."

During the long interregnum between the ancient Oriental and the modern European civilization there was such continuous robber warfare and rapine that the arts of peace, outside the quiet cloister, were not encouraged. There was no dental art worthy of the name and comparatively little chemical research. In fact, modern chemistry, as a science, may be said to date its birth from the discovery of oxygen; and, coincidently, dental science must claim its origin as beginning about the same time. It would be superfluous and beyond the scope of our present purpose to note the advances which these divisions of human effort have made since then. They are both concomitants of higher civilization. "Show me," said Tyndall, "the country where the greatest quantity of sulphuric acid is used, and I will tell you that its people are, above all others, the most generally enlightened." In like manner we may say that the people of any community, where dentistry flourishes, are of a higher order of intelligence than are those found elsewhere.

Dentistry is and should be cosmopolitan. It appropriates with due permission facts and methods from the humblest as well the most exalted occupations, and in return gives back to them a large per cent of the benefits received. Metallurgy, molding, sculpture, surgery, medicine, physics and chemistry have been appealed to not in vain; and as a consequence the accomplished dentist could point out to willing youth the best means of becoming experts in these separate vocations.

Of all these sciences that of chemistry is the most universal, since it has no limitations; all forms of matter and force must own its sway. In its domain secrecy, mystery and charlatanism are no longer tolerated; and all who will may partake freely of the benefits it has conferred and will continue to confer in increasing ratio upon man-

alcohol, and that an alcohol and an acid combined will produce an ester, and water:



Perhaps the worst chemical blunder ever made officially in a dental journal occurred a few years ago in a foreign periodical, wherein the editor, with the characteristic stupid arrogance of his kind, criticising a brief scientific description of ordinary combustion, wherein light is an essential accompaniment, mentioned the rusting of iron as his beau ideal of that process. We could forgive him for this, were it not that he presumed to know it all on every question of a similar nature.

It goes without saying that a foreknowledge of certain rules in chemistry is a great aid in adapting means to ends, when anything new in that line appears. For instance, in cataphoresis, we were told at first that the positive pole must be used in contact with whatever drug was employed; whereas it is well known in electrolysis that the radicals or ions of conducting-compound liquids separate in a perfectly definite manner, the positive radical being attracted to the cathode and the negative to the anode; so that we will likely obtain better results by selecting anaphoresis when we wish greater penetration of a strongly electro-negative radical. A duly certified list of comparative positive and negative classes of radicals has been known for many years, of which we are welcome to take advantage; and in return for all these favors, would it not be an act of courtesy on our part to approve, when occasion permits, certain changes in chemical nomenclature, adopted through official international committees appointed for the purpose, by the most influential scientific bodies? Our journals, it is almost unnecessary to say, editorially are fully up to, indeed, in advance of the times, but we see too often in reports of discussion in our local societies, and in some of our latest text-books, names of things and terms that shock the sensibilities of euphony and truth. Take, for example, *Potassium iodid*. Is not that name more pleasant than iodid of potash, especially when we realize that the compound contains no potash whatever?

We have been surfeited for a long time with "cocain hydrochlorate," and lately with "eucain hydrochlorate," although a generation ago it was decided that acids like hydrochloric (HCl), hydrobromic (HBr), etc., whose electro-negative radicals are elementary,

ease with which we have to contend. Happily, the study of chemistry, while acquainting us with these potent influences, also points out to us within the sphere of the same science the means at hand to combat them, most beneficially provided, if we will but apply them.

No member of this—as the late Dr. Atkinson termed it—"Excelsior Association of Dentists" will doubt the culminating discovery of Dr. Miller, that at least lactic acid is developed in the mouth by the presence of bacteria and the materials necessary to their support, and also to the play of chemical affinities at the point of carious destruction; and, further, that the destroying agent acts molecularly with as definite results as pertain to any other natural phenomenon. Some years ago, when the so-called "germ theory" of disease was introduced, there were not a few who received the innovation with satisfaction; because they would not or could not understand, and therefore approve, the chemical theories of Watt. It is now, however, accepted beyond question that there is no conflict between the two theories—that bacteria are a necessary factor in fermentation, and that their only trysting-places are in the midst of extraneous material susceptible to that process, the elements of which must obey the laws of their affinities; and if, for instance, among other compounds, destructive and otherwise, lactic acid, as proven by Miller, is developed in contact with a tooth, destruction of that part will proceed molecule by molecule; so that, while it is probable that teeth, like other organs, yield to an increased non-resisting influence of a "periodic law," dental caries is *per se* a disease of purely chemical propagation. From this latter view-point the relations between chemistry and dentistry are not of the most amicable character, yet the science whose unseen minions are directly responsible for the existence of our principal enemy will inevitably furnish weapons of defense other than we as yet possess.

No wonder that dentists are perhaps unconsciously more interested in chemistry than are the members of the mother profession; at least, it would so appear by personal contact with them, and by impartial reading of medical and dental journals. One of the former recently, to cite a single example, expressed its surprise that any two acids could neutralize each other; and then went on to say, that by mixing one part of acetic acid, and one and one-half of carbolic acid, a neutral compound will result. Any tyro in organic chemistry knows that phenol is not an acid, but on the contrary is an

confer names on salts which terminate in *ide* (the final "e" has been eliminated); therefore, the name of every salt of such acids should end in "id," as "cocain hydrochlorid." Only those acids which have compound negative radicals give names to salts ending in "ate" or "ite," as the case may be. Sulfuric acid (H_2SO_4) forms sulfates; sulfurous acid (H_2SO_3) sulfites; chloric acid ($HClO_3$) chlorates; chlorous acid ($HClO_2$) chlorites, etc.

Life is too short to nominate for consideration at this time more than one other frequently misapplied word, which is "density." We use it, do we not? as a synonym for hardness in the structural substance of teeth, instead of in its true meaning, i. e., specific gravity. Ice is harder and more compact to a cutting instrument than is liquid water, but it is less dense. The diamond, among the hardest of bodies known, is only three and one-half times as heavy as water; while pure gold is comparatively soft, although more than nineteen times as heavy as the standard, water. It is not possible to believe that the specific gravity of a tooth has anything to do with predisposition to disease, or even that compactness of calcium constituents is a condition that presents a physiological barrier to decay. While these matters may perhaps appear of small practical importance, yet surely, as we claim to be devoted disciples of pure science, we have no right to trifle with accepted nomenclature.

DOES THE PRESENT METHOD OF TEACHING BY DIDACTIC LECTURES BEST QUALIFY THE STUDENT FOR THE PRACTICE OF HIS PROFESSION?

BY JOHN S. MARSHALL, M. D., CHICAGO. READ BEFORE THE SOUTHERN
DENTAL ASSOCIATION, AT OLD POINT COMFORT, AUGUST, 1897.

The spirit of the times is one of progress, and for several years this spirit of progress has been "moving upon the face of the waters" and stirring the stagnant pools of our educational institutions. The foremost educators of our land are seeking for better methods of teaching, better preparation of the knowledge to be imparted, by arranging and classifying it upon the most approved scientific plan, so that it may be the more readily comprehended and retained. Knowledge to be of value must be useful. To be useful it must be classified. When classified it is accessible and capable of being applied to the subject under consideration.

The faculties of the dental colleges have not been unmindful of their obligations to the student, nor of the spirit of the age, and have tried to keep their institutions well to the front in this "onward march of progress." They have recognized the growth of the profession in its various departments and have endeavored to keep pace with it. Many additions have been made to the course of study during the last few years, but nearly all of them have been upon the practical side, in the line of technique and laboratory work.

There is, however, great need of improvement in other directions, particularly in the present mode of teaching by didactic lectures. The teaching in this line is just the same to-day that it was fifty or sixty years ago. A few colleges have made an attempt at improvement by the introduction of other methods in combination with the lecture courses, but there has been no real advancement which can compare with the work now done in the technique rooms and laboratories. In this respect we are behind the times and need to bestir ourselves if we would maintain the reputation of the American dental colleges and the prestige of our graduates.

I shall therefore propound the question which forms the title of this paper. My reply to this question is, No! My reasons for this negative answer have grown out of a considerable practical experience, covering a number of years as teacher in medical and dental schools. I can therefore approach the subject with the feeling that I am not a novice, and that perhaps out of this experience and observation I may be able to suggest a better method of educating the students under our care than by this inadequate and antiquated method of the past. I am fully aware, however, that many of my colleagues have also felt the inadequacy of the lecture method to *instruct* and *educate* in the best sense of the terms, and of their desire for a better means of placing before the students the subjects which they desire to teach.

My first objection to the didactic lecture method of teaching is that there are very few men in the profession who have the eminent qualifications to make successful teachers under this system. The power to write eloquent sentences, to display oratorical pyrotechnics and compose brilliant climaxes are not qualifications for teaching. The orator and the stump-speaker have no place in the class-room.

Entertainment of the students by funny stories is not the highest duty of the instructor. The paramount qualifications for the office

student, and this is the class for which we have to plan, to remember more than a few of the most striking thoughts presented in each lecture. While, on the other hand, if the student attempts to take notes he loses at least one-half of the lecture, unless he happens to be proficient in shorthand. In some of our schools the various classes have been in the habit of employing a stenographer to report each lecture upon certain subjects, and then have it printed for the use of the class, as the only means by which they could get the full benefit of the teaching.

The fourth objection which I would raise lies in the fact that, as a rule, the students show their greatest weakness at the time of examination concerning those subjects in which they have been obliged to depend largely for their information upon a course of lectures. Listening to a course of lectures, and studying the same subject from a suitable text-book, are not to be compared as a means of education.

To remedy these defects in this method of teaching, I would suggest that each lecturer should furnish to his faculty a full and complete syllabus of his entire course of lectures, and that the same be printed for the use of the students. These should be distributed to the class one lecture at a time, as may be indicated by the teacher when he goes before his class. In this way the class could readily follow the lecture during its delivery, and be relieved from the necessity of taking notes, which at best are inadequate to a good understanding of the subject. Furthermore, the class should be quizzed upon each lecture by the teacher himself, or by an instructor especially appointed for this purpose, who is in sympathy with him. The syllabus should be used in this work instead of a quiz compendium. By this plan the lecture method might be stripped of many of its objectionable features. The teaching from the lecturer's desk and the work in the quiz-room would then be uniform, and the most would be made out of this system that circumstances permit.

With these improvements in this method of teaching it would still be far from all that was needed, for many of the defects would remain without a remedy. I firmly believe that our whole system of oral teaching needs to be revolutionized by the introduction of suitable text-books and a system of recitations. To my mind the recitation system of instruction is by far the most satisfactory upon all subjects not purely clinical or manipulative. It has been my experience that students who have been required to study a certain

of teacher are *ability to impart knowledge and to teach the student how to apply it*; but how few there are who possess both these important qualifications. Many teachers are able to impart knowledge, but few have the eminent qualification for the important labor of teaching how to apply it. Knowledge without this power is like a library without a reader, "more ornamental than useful."

My second objection is based upon the undisputed fact that a large majority of the gentlemen who occupy positions as teachers in our dental schools are busy practitioners, whose time is fully occupied with professional duties, but who for the love they bear the profession are willing to give the best of the energy left them each day to preparation for the duties of the lecture-room. Not one of these gentlemen, however, would say that such effort is the best that he is capable of had he more time for preparation and more energy to put into it. This objection can never be overcome until such time as men of wealth will endow these institutions, and thus make it possible for the schools to pay their professors a salary that will be sufficient to preclude the necessity of keeping up a practice for the sake of the income. Under such circumstances the entire time of the professors could be given to the duties of teaching and original investigation; conditions which are greatly needed and devoutly to be hoped for.

Another class of teachers go before their students with evidently some preparation upon the subject to be taught, but frequently sidetrack themselves over the relation of some pet case in practice and never get back to the text again that day. While another class, all too numerous, often enter the lecture-room with little or no preparation and simply talk against time, rambling over the entire field comprehended in the curriculum, and when the students leave the lecture-room they know no more than when they entered it, while their minds have become so befogged by this *hodge-podge* to which they have listened, that they have no clear comprehension of the subject supposed to have been taught. This is not an overdrawn picture, for many of you know of like conditions and the causes which have produced them.

My third objection is based upon the fact that, no matter how eminent and well qualified the teacher may be as a lecturer, the students do not obtain such benefit from his wisdom as they have the right to expect and demand, because it is impossible for the average

forces, that I shall include all the methods of applying an electric current to the dental organs for producing anesthesia, whether used in conjunction with a medicament or not. These theories are: First. The polarization of the tissue producing an inhibition of the sensory impulse. Second. Osmosis. Third. Electrolysis.

The first theory provides that when an electric current is applied to a tooth, with or without a medicament, the conditions produced are almost or entirely due to the effects of the current and not to the medicament, other than as an assistance in conducting a current. The supporters of this theory are here divided into two classes, from a difference of opinion as to the exact method of this inhibition; whether the decreased excitability is due to the polarizing effect of the current on the tissue, or to its inhibition of the normal sensory impulse by its passage through the nerves.

Prof. Neischwanger, of Chicago, has said that, owing to the liberation of hydrogen at the negative pole and of oxygen at the positive pole, there would be at these two regions, respectively, a condition of increased and decreased excitability, due to the production of an acid condition at the positive pole and an alkaline condition at the negative pole, and that the zone of neutrality would be the median of resistance; and consequently that the negative or indifferent electrode should be placed as far as possible from the polarizing electrode. The adherents of this polarization theory maintain that the amount of current used is not great enough to produce sufficient electrolysis of the medicament used to produce its effect on the tissue.

The other division of this first theory is, that a constant current applied to the dental branches of the tri-facial nerve, with the positive pole applied to the tooth, and the negative pole over the gasserian ganglion, inhibits the normal sensory impulse. The leading advocates of this theory maintain that a certain and intricately definite amount of current applied in the manner just described will produce a condition of anesthesia in the tooth, and that either too little or too much will not produce this condition. They call it "short circuiting the nerve." For its application the positive pole of the constant current is attached to the dental engine in such a manner as to make the bur the electrode, the handpiece being insulated, and the negative pole is applied over the gasserian ganglion, on the same side as the tooth to be operated upon, which is perfectly insulated. No medicament is used in either of these two processes except moisture in the former, the polarization theory to reduce the resistance of the dentin.

The next theory provides that the medicament, which is applied by the electrode, is the agent which does the work, but that it is carried in by a physical force. That some way, just as a stream of water carries sediment with it, the electric current carries the ingredients in solution with it through the solvent and through the tissue. To secure the conditions best suited for the development of

number of pages each day from a suitably prepared text-book, with the assurance that they would be closely quizzed upon each lesson, have shown a much better understanding of the subjects studied than those who have been educated by the old system of didactic lectures. Furthermore, by the use of carefully prepared text-books a systematic plan of study is followed and the subject matter is classified and arranged in a natural order. Material prepared in this manner is much easier to comprehend and to remember, while the student is taught correct methods of thought and to reason from cause to effect.

By following the recitation method of teaching, the best instruction could be obtained from recognized authorities in the various departments to which this plan applies. The selection of the text-books might be placed in the hands of a special committee of the faculty, who should, after conference with the professors of each department, announce to the students the books that would be required for each school year.

In the selection of a faculty it has been the custom, under the old plan, to appoint the men of best minds, and of the largest experience in special departments, to work in the lecture-room; while the younger men, who have their reputations still to make, have been placed in the, to my mind, most important positions—as teachers in the laboratories and the clinic-rooms.

By the adoption of the recitation system of teaching the younger men would be placed in charge of the instruction in the recitation-room, with orders to follow the authorized text-book. The application of the knowledge thus gained should be taught in the laboratories and clinic rooms by the professors themselves, rather than by a corps of demonstrators whose knowledge of, and experience in the special subject taught is often of the most limited nature.

With such a change in our system of oral teaching I believe much greater advancement could be made by the students in the same length of time, and we should have the satisfaction of knowing that they were better qualified for the practice of their profession than by the old method.

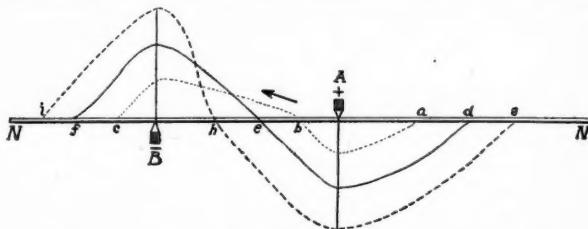
PHENOMENA OF CATAPHORESIS.

BY WESTON A. PRICE, D.D.S., CLEVELAND. READ BEFORE THE AMERICAN DENTAL ASSOCIATION, AT OLD POINT COMFORT, AUGUST, 1897.

In this paper I shall confine myself to the consideration of phenomena attending the application of an electric current to the human body, with and without an interposing medicament, and especially as applied to the dental organs.

There are three distinct theories as to the forces at work and their particular action in these processes, and there is such a diversity of nomenclature, and variety of methods for the application of these

covered that the passage of a constant galvanic current through a portion of a nerve produced a change in the electro-motive forces existing between the longitudinal and transverse surfaces, whereby the resulting *nerve-current* was either increased or diminished, according to the direction of the constant current. To this condition he applied the term electrotonus. It was subsequently shown by Pfluger in 1859 that a definite change in the irritability of the nerve is also caused by the passage of a constant galvanic current, and as it is intimately related to the change in the electro-motive forces he applied to this *alteration of excitability* also the term electrotonus. This will be the application of the term in this



paper. He showed very clearly by the diagram the relative effects of different terms. "The abscissa line N-N represents the nerve, the decrease in the excitability of which is indicated by an ordinate directed downward, but the increase in excitability by an ordinate directed upwards. The electrodes conveying the current to the nerve are represented by A the positive, and B the negative pole. The relative extent of the alterations of the excitability, as revealed by the energy of the muscle contraction following the application of a uniform stimulus, is shown by the curves, the size and extent of which represent the changes produced by a weak, medium and strong current. The curve also shows that with a weak current (a b c) the excitability in the anodal (positive) zone is increased, and that the neutral point d lies close to the side of the positive pole. From this point the changes in excitability gradually increase and reach their maximum in the neighborhood of the electrodes, from which both phases gradually decline. The position of the neutral point also indicates that by far the larger portion of the intra-polar region is in a condition of increased excitability or catelectrotonus. The curve d e f, similar in its form to the preceding, represents the alterations in the excitability produced by a current of medium strength; in direct proportion with the increase of current—strength, there is an increase in the amount of anelectrotonus and catelectrotonus and the distance to which they spread themselves into the extra-polar regions. The indifferent point has advanced toward the center of the intra-polar regions, indicating

this process, the positive pole is placed in the cavity or on the tissue to be anesthetized, with an interposing layer of the obtunding medicine, and the negative pole placed at any more or less remote point. Dr. Morton has said, "You may even drive solid particles into tissue, and solid particles will move through fluids by the aid of electricity." He also says, "You cannot be too sure of your osmosis."

Dr. Peterson, in the International System of Electro-Therapeutics, says, "From a medical standpoint we understand by cataphoresis the introduction of medicaments by means of electricity into the body through the skin or mucous membranes. It seems to be a *purely physical process* and has nothing to do with electrolysis."

Electrolysis, the last theory, not generally accepted, provides practically that all the effect produced in passing an electric current through a medicament, as applied in cataphoresis or in any other way, is electrolytic.

As the next steps let us consider: First. The physiological effect of a constant current on nerve tissue. Second. The laws governing osmosis. Third. The laws governing electrolysis.

For the study of the first, take for convenience the sciatic nerve of a frog. Apply the electrodes of a polarizing current to two points distant from each other on the nerve. Before considering the phenomena of muscular contraction, let us observe the conditions this current produces in the nerve relative to any other irritant applied to that nerve. Suppose the irritant to be mechanical, not electrical, to prevent confusion with the polarizing current. The negative pole of the polarizing current is placed nearest the muscle. The following phenomena will be observed: First. That the nerve at different points has altered excitability, at some places less than the normal amount of stimulation will produce a contraction of the muscle, while at other points it will take far more than the normal amount of stimulation to produce this contraction, due to the passage of a current. Second. It will be found that these regions of increased and decreased excitability are confined to the vicinity of the particular electrode; the region of the decreased excitability about the anode or positive electrode, and the increased excitability about the cathode or negative electrode. Third. There is a point between the electrodes of normal excitability, which point *varies* in distance from the respective electrodes, according as the current is *weak* or *strong*. Fourth. The *degree of decrease or increase* of excitability is in *direct proportion* to the strength of the polarizing current. Fifth. This condition ceases practically at the instant the current is broken.

The alteration of excitability in the region of the poles we will know as *electrotonus*; that at the positive pole or anode, as *anelectrotonus*, and that at the negative pole or cathode as *catelectrotonus*. These terms have been used by different physiologists to express two different conditions. In 1843 Du Bois-Reymond dis-

that this portion of the nerve is almost equally occupied by the opposite states of excitability. The curve *g h i* represents still further the changes following the employment of a strong current." These changes in excitability are not dependent upon or related to the special nature of the electrical stimulus, for they exhibit themselves upon the application of all forms of stimuli, whether mechanical, chemical or thermal. The degree of electrotonus is in direct proportion to the strength of the constant current, even to the point of destruction of continuity of the nerves. This is a very important fact.

The foregoing laws pertain to motor nerves. Nothing analogous has yet been observed in secretory nerves, but Donders confirmed it in his experiments upon the inhibitory fibers of the vagus. Does an analogous condition exist in sensory nerves?

These preceding laws, as also the laws of contraction produced by an electrical stimulus, have been established on the isolated nerves of frogs under abnormal conditions. Can they be verified on the living human body? Why not? Because of the nerves being surrounded by tissue of different degrees of resistance. This will be the key to the answer of one of these theories.

Suppose the positive pole be placed in a tooth and the negative over the gasserian ganglion, and suppose that the sensory impulse is inhibited, just as the motor is. Will the current travel on the nerve or on the surrounding tissue? To determine this I chloroformed a dog, and with expert assistance dissected out the inferior dental nerve from near the base of the skull to the inferior dental foramen and insulated. The inferior cuspid on the same side was excised and insulated and an electrode placed in the pulp tissue. With very great care the resistance through the path (pulp and nerve) was determined and found to be 23,630 ohms. The resistance through the path (the pulp to a point equi-distant away on the muscle), with the same electrodes, was determined and found to be 18,570 ohms, 5,060 ohms less than that of the nerve. This means simply that if the gasserian ganglion were right on the surface and the negative pole applied to it, the amount of current passing through each, the nerve and muscle, would be inversely in proportion to their resistance. But the nerve does not come to the surface, hence the current to pass through the nerve must travel along on it to a point opposite the negative electrode, and then pass out through the tissue to the surface, which the advocates of this theory claim it does. But an electric current always seeks the path of least resistance, so to fulfill the requirements of this theory the resistance through the nerve would have to be infinitely lower than the resistance of the surrounding tissue. A point of interest here is that the cross-section resistance of a nerve is still five times greater than its longitudinal resistance. The facts are that the current would diffuse throughout the entire tissue of that side of the face, and the amount of current flowing

through the nerve at any point in cross-section would be less than that flowing through the same cross-sectional area of the tissue at any point around it, within a wide area. Hence the theory of *short-circuiting* a nerve is inconsistent and its accomplishment in dental therapeutics clearly impossible. I have demonstrated this on the inferior maxillary of a sheep and on the sciatic nerve of a frog. This is a very important consideration, as it determines to a great extent the possibility of realization of the fundamentals of both the inhibition and the polarization theories. It was because of this fact that Erb in 1867 failed to verify on the human body the laws established by Pfluger in 1859. He found as a constant result of many experiments that there occurred a diminution of excitability in the extra-polar catelectrotonic region and an increase of the extra-polar anelectrotonic region. Helmholtz subsequently demonstrated that the cause of this deviation from Pfluger's law is the position of the nerve in the uninjured body. He says, "Since the nerve is in a position surrounded by a well conducting medium, even better than itself, the current density in the nerve must rapidly decrease with distance from the electrode. Whilst, of course, under the polarizing electrode the current density in the nerve is the greatest, this density, on account of the moist conductors surrounding the nerve, so rapidly decreases that it becomes almost *nil* for the nerve at even a short distance from the electrodes. At a small distance from the positive pole, therefore, the density is so slight that it may be assumed without error that the current now leaves the nerve, or in other words, the cathode (so far as the nerve is concerned) is to be found at this point. It is to be expected, therefore, that the effects of the opposite pole would be observed at only a short distance from the applied pole."

Now as regards the application of a constant current to the dental organs. Where will the current leave the dental nerve if the positive pole be upon the exposed pulp and the negative on the cheek? Not to discuss the anatomical structure of the pulp—nearly two-thirds of a pulp consists of blood vessels and their contents; much less than one-third nerve fiber, and the balance connective tissue, etc. The blood has a greater conductivity than the nerve tissue for the same cross sectional area, consequently most of the current will travel through the surrounding tissue and not through the nerve tissue. The size of the apical foramen and the resistance through the walls of the pulp-chamber are of some importance in this connection. In the case considered above but a very small per cent of the entire current flowing would travel for any distance on the nerve fibers, since it would go direct to the less resistant tissue. Suppose the current applied just as in the last case, except that the pulp is not exposed and the current must pass through the dentinal tubes. Here it seems to me would be an ideal condition for the demonstration of either the polarization or the purely inhibitory theory. We

would expect that since these tubes contain chiefly the projected fibers of the odontoblastic or spindle-shaped nucleated cells surrounding the pulp, which are supposed to be the periphery endings of the dentinal nerves, the current would of necessity have to pass through this structure to the pulp before it could disseminate to the other structures. Of course the lime salts of the dentin are a non-conductor. If any effect is produced by applying the current in this manner through the drill it must be on this structure in the tubes, for it would disseminate immediately on arriving at the pulp tissue. These cell projections probably fill completely the space of these tubuli.

Will the current applied under these conditions produce anesthesia of the part to any considerable extent? I answer guardedly and after giving the question a very thorough investigation, No. From a physiological standpoint it would not be possible, since we are dealing with a sensory nerve, the most sensitive one in the body, whose function is to produce the sense of pain with the very slightest irritation. If the sensory nerve did not respond in the form of pain to the passage of the current, we would expect even then the amount of current necessary to produce this condition, judging from motor nerves, would be many million amperes.

But you say the impulse which carries the sensation of pain in the sensory nerve is related to the internal nerve-current of the nerve, discovered by Du Bois-Reynold, and why could not this impulse be interposed by an artificial current, thus not permitting the pain impulse to pass? There are two answers: First. This nerve-current always travels from center to periphery in motor nerves, and from periphery to center in sensory nerves, always in the direction of the impulse, hence it would be in the same direction as the polarizing current, which really increases this nerve-current when in the same direction. We should then expect on this theory an increase of sensitiveness. Again, the normal sensory impulse has no connection with this nerve-current, and furthermore, the origin of this nerve-current would answer this question. I think it is inconsistent to expect to be able to pass enough current through the sensory nerve to produce that condition of anelectrotonus, since the pain limit will not permit of scarcely the thousandth part of so great a quantity of current to be passed as would be necessary to produce that same condition in a motor nerve, provided the sensory nerve were capable of an analogous reaction. For the clinical answer to this question I have tried in vain to produce this condition, using every variety of conditions in the tooth, and all combinations of potential and resistance possible in instruments on the plan of this theory. It is very simple and would be ideal if possible. Any good cataphoric apparatus will produce every possible combination of any of these instruments in use at the present time.

I have verified repeatedly that the resistance through a tooth,

accordingly as the cavity is wet or dry, will vary from thousands to hundreds of thousands of ohms. I have measured cavities in dentin after dehydrating and found them to vary all the way from 20,000 to 1,000,000 ohms, and in different parts of the same cavity almost that amount of variation over the surface of the dentin alone, while through the enamel, of course, those figures will be multiplied by thousands.

Two things must be evident to everyone at a glance, viz., that in delivering the current to a tooth, from the bur as the positive electrode, it is impossible to have a uniform amount of current flowing as the bur is moved to different parts of cavity, owing to the variableness of resistance of the different parts of cavity; and that with so very high a resistance it would be impossible to have more than an extremely weak current flowing unless the potential were very many times that used.

With my instruments I can measure with precision and express in amperes any amount of current from a one-hundred-and-twenty-five millionth of an ampere to one-twentieth of an ampere. I measured the actual amount of current flowing in amperes in the use of two of these instruments, as used by their exponents, and found it to vary from six millionths of an ampere to one-twelfth millionth with one, and from one six millionth to one sixty millionth of an ampere with the other instrument. In view of the fact that this condition of anelectrotonus is in direct proportion to the amount of current flowing, I have passed as high as two milliamperes of current through a healthy live pulp and tried to work on it at the same time, but could not produce this condition of anelectrotonus. I have even let it flow for fifteen minutes and not been able to touch the pulp even slightly without pain. We saw from the law established by Pfluger that this condition was in direct proportion to the amount of current flowing, hence how impossible for the millionth part of an ampere to produce this condition if two thousand times as much did not.

Another feature here appears, making the realization of the anelectrotonic condition of the dental nerves impossible, which is the law of stimulation of an electric current. This law holds that it is the sudden variations of current strength that excite muscular contraction in a motor nerve, or in a sensory nerve produce its impulse, pain. Hence when the current is delivered to the tissue from a revolving bur, every blade brings with it an interruption of the current strength, and if the current strength were great enough to produce anelectrotonus it would cause excruciating pain.

What are the laws governing osmosis? This theory provides that when we apply an electric current to tissues, with an interposing layer of some medicament under the positive pole, that medicament itself will be carried into the tissue by means of a physical force possessed by the current. *What is osmosis?* It is the diffusion of a dissolved substance in a solvent to equalize the concentra-

tion. If a layer of pure water be placed over a solution of sugar the system immediately commences to suffer a change. The particles of sugar rush from places of a higher to places of a lower concentration. This diffusion process, as the phenomenon is called, does not cease till the concentration has become the same in all parts of the solution. Let us imagine the sugar to be separated from the pure water by a semi-permeable membrane, such as will allow of the passage of the water, but not of the sugar. Of course the sugar will exert a pressure, and since it cannot go to the water it will produce a hydrostatic force against the partition, moving it upward, if the apparatus be so arranged that it can, or if the partition cannot move, and the chamber in which the sugar is confined be arranged with a capillary tube, the water will pass into the sugar solution through the membrane, increasing the volume of the confined solution, causing it to rise in the tube to a height equal in weight to the osmotic pressure of the sugar. This condition exists in any possible solution and is influenced by many conditions. The osmotic pressure of cane-sugar in water has been demonstrated by Pfeffer, using cupric ferro-cyanid as the semi-permeable membrane. He has shown that a saturated solution exerts a pressure of about four atmospheres, which would at the ocean level be about sixty pounds to the square inch. The osmotic pressure is in definite proportion to the concentration and temperature. This condition is perfectly analogous to that of a gas confined within enclosing walls. It exerts a definite pressure which is influenced both by temperature and density. The molecules of the gas tend to fill all the space, each endeavoring to get as far from every other molecule as possible. Just the same condition exists among the molecules of the dissolved substance; every molecule endeavors to get far away from every other molecule, thus filling the greatest possible space; and they will continue to do so just so long as more pure solvent is provided. It has long been noticed that a coincidence existed between the osmotic pressure of a substance and the gas pressure of the same substance. It is known that "the osmotic pressure is exactly the same as the gas pressure which would be observed if the solvent were removed and the dissolved substance were left, filling the same space in the gaseous state at the same temperature." There is a constant relation between the osmotic pressure, the freezing point, and the vapor tension of substances of the same molecular specie.

From the few laws governing osmosis just quoted we can make some valuable deductions as to the role this force plays in cataphoresis. Since the nature of the solvent has nothing to do with the osmotic pressure, it at once becomes obvious that—First. It does not matter what solvent we use for our cocaine (provided it is the force of osmosis that accomplishes the work). Second. Since the osmotic pressure is in direct proportion to the concentration, the solution

should be as nearly saturated as possible. Third. Since the osmotic pressure is increased to a definite extent by each degree in increase of heat, the solution should be kept as hot as possible.

These hold good for practical application, if the force we are dependent upon is osmosis. Will osmosis carry cocaine into dentin to any considerable extent? To answer this I have sealed a saturated solution of cocaine in cavities for two days, and again for two months, without producing anesthesia except on the very surface of the cavity. I have also applied it for some time on an exposed pulp and could not cut very far into it. Sulphate of strychnine and bichlorid of mercury applied on cotton to the chests of frogs produced no physiological effect, while with a current death was produced in a few minutes. This answers the question whether osmosis alone can produce this condition. Now for the theoretical suggestions. We know that if a saturated solution of cocaine be placed in a cavity there will be a difference of concentration between the cavity and dentin and the cavity and pulp. We know also that the velocity of migration of the dissolved salt will depend on two things: The osmotic pressure or "head," and on the resistance. We have all observed how slowly a very fine precipitate settles. This is the resistance of the solution. Just so the resistance of any solvent to any dissolved substance can be determined from the osmotic pressure and velocity. Now as a matter of fact all cell tissue and porous partitions offer great resistance to osmosis, and many cells have the power of permitting some substance to pass while excluding others. This is the foundation of plant-life physiology. It is for this reason that some bacteria are so difficult of destruction. In the dentin we have both of these conditions, and it would be expected that a very great barrier would exist here to osmosis of the cocaine. So far as I know, no thoroughly scientific study has been made of dentin in this connection. We are forced to conclude that osmotic pressure is not the force on which depends the transmission of cocaine through dentin into the pulp. This brings us to a consideration of the last question, viz., What are the laws of electrolysis?

What is electrolysis? "It is the change that is effected by the passage of an electric current in so far as the electricity exhibits itself as such." How is electricity conducted? As expressed by Nernst and translated by Palmer, "The conveyance of electricity in conducting substances may happen in two ways, viz., with or without the associated transportation of matter. The latter happens in the case of metallic conductors (first class); the former in electrolytic conductors (second class); hence these are called conductors of the (first) and (second) classes respectively." The nature of conduction in the first class (metallic) is unknown, but the nature of conduction in the second class is perfectly understood. From the above author I quote that, "The process of the conduction of a current, as

a result of electric forces in conductors of the second class, consists in the displacement of free ions. By free ions we mean those which are not united with each other to form electrically neutral molecules; the positive ions migrate in a direction from anode to cathode, the negative ions in the opposite direction."

A solution conducts electricity better the more numerous the ions and the smaller the friction which they encounter in their migration. This conception may be applied unchanged to every substance which conducts electrically—whether gaseous, liquid or solid; whether simple or a mixture. In so much as it is impossible for a weighable quantity of a substance to consist solely of positive or negative ions—because this would signify the accumulation of such immense quantities of electricity that the substance would at once be dissipated in consequence of the repulsion—only *compound substances* (but no elements) have the property of electrolytic conductivity. Moreover, the molecules of the conducting substances must be dissociated in order that there may be free ions present; and the free ions are divided into two classes which are sharply contrasted, according as they are positively or negatively charged. The electrolytic charges of the ions are equally great and equivalent whether they occur in solution or in substances having a simple composition. This would be anticipated, because the fundamental laws of Faraday hold good both for water solution and also for fused salts. It is very remarkable that *we do not know of any electrolyte which, in the pure state and at ordinary temperatures, has the power of (electrolytic) conductivity to any marked extent.* Thus, liquid hydrochloric acid or pure water cannot conduct electricity noticeably. But when they are mixed they become conductors. The reason for this certainly is not that the ions in the pure liquid experience too great a resistance to their movement, but rather that the liquid electrolytes in the pure state are dissociated only to the very slightest extent. So, in the passage of a current through any liquid except a metal, the current can pass only by dissociating some of the molecules, called the ionization of the medium, and these ions which are equal in quantity migrate in their respective directions. The measure of the ions traveling in either direction is the exact measure of the ions traveling in the other direction and the measure of the current flowing.

This is expressed by Nernst as follows—"When the galvanic current passes through conductors of the second class, viz., electrolytes, then, in addition to liberation of the heat, there occurs a transportation of matter (migration of the ions); and also on the limiting surfaces between the conductors of the first and second classes there occur peculiar chemical processes, which latter consist primarily in the solution of the electrodes or in the separation of the ions from the electrolytes, but they are usually complicated by secondary reactions between the electrolyte and the separated products." This reaction and the phenomena attending it has, by a new reaction of

this ion in a different place, forming again an insoluble precipitate, been taken by some as a proof of the movement of solid substance through the solution.

The quantity of the ion separated in unit of time upon the electrode is proportional to the intensity (strength) of the current; and the same quantity of electricity will in the most differing electrolytes electrolyse chemically equivalent quantities of ions. In those cases where the chemical value of the ions is capable of changing, of course the meaning of *chemical equivalence* changes; thus the same current which separates 200 grams of mercury from a solution of $Hg\ NO_3$ will separate 100 grams from a solution of $Hg\ Cn\ 2$. The above author says, "It is only in the rarest cases that the ions themselves are formed as the products of electrolysis, i. e., products which have the same composition as the ions as they are primarily separated, which differ from the ions only by having given up their electric charges. Thus the hydrogen ions appear in the form of H_2 ; the ions of certain metals in the form of metals; and under suitable conditions the ions of the haloids (acidiferous elements) in the form of metaloids. But much more frequently the ions either act upon each other on being separated, as in the decomposition of the acetic acid ion according to the equation, $2CH_3\ COO = C_2\ H_6 + 2CO_2$, producing ethene and carbon dioxid; or the ions may react upon the water, as when separated sodium gives off secondary hydrogen; or finally, the ions may react upon the metal of the electrode, as when separated chlorin forms the respective chlorid."

The (freshly separated) ions, which have been deprived of their charges by aid of the passage of powerful electric energy, are illustrations of substances containing a large quantity of free energy, that is, illustrations of great affinity. The (freshly separated) ions are able to perform reactions of which they are quite incapable in the ordinary state; thus freshly separated hydrogen, unlike ordinary hydrogen, can reduce nitric acid to the so-called "nascent state." It is especially worthy of our notice here that electrolytic dissociation, as compared with ordinary dissociation, is influenced but slightly by temperature. In fact it sometimes happens that with rising temperature it diminishes, or it may slightly increase, which is in strong contrast with ordinary dissociation, which always rapidly increases with rise of temperature.

Let us now apply some of these laws of electrolysis to the particular process in which we are interested. Suppose the positive pole to be applied to the dentin of a tooth and the negative to the cheek. An interposing layer of medicament, say cocaine in water solution, is between the metallic positive electrode and the dentin. Now the only way electricity can get from the metallic positive electrode to the metallic negative electrode is by the dissociation of some of the molecules in every substance of the second class through which it passes. In every part of the course through the cocaine

solution, the dentin, the pulp, the connective tissue, the blood vessels, the muscle tissue, and sponge on the negative electrode there will be a cleavage of some of the molecules of the various chemical compositions into a positive and a negative ion. These ions, with equal force and chemical equivalence, start on their respective journeys toward their opposite poles. They meet with friction, which varies for different ions, and since they have the same forces behind pushing them, their velocities will vary with their resistance. If in their course they meet a new ion or an element or compound for which they have a greater affinity than the force which separated them, they will unite with it until they are again called into service. Unless an ion found such an affinity it would keep on going until it got to the metal plate of negative electrode, and if it could unite with it would do so. If not, would be deposited upon it or be liberated in the form of gas.

Now the question we have heard raised so often, "Is the current we use strong enough to produce any electrolysis?" must be settled, for if we have no electrolysis we cannot have any current flowing, and the measure of the current is the measure of the electrolysis, and vice versa. In the case above the hydrochlorate of cocaine would be broken up. The positively charged ions passing into the tissue toward the negative pole will doubtless meet negatively charged ions for which they may have great affinity coming towards the positive pole, and at once in the tissue there will be formed a new product. Now it is a fact that only a small per cent of the molecules will ionize or dissociate, hence we see why there has been practically no difference in the effect we observed from using a saturated solution of cocaine or a one-per-cent solution.

I have observed the following results by applying the cocaine solution as stated above: *First.* In nearly 1,500 cases, of which I have kept a record, the per cent of perfectly successful operations has been between 95 and 100, and of late, with the increase of experience, all cases have been successful on the second application, if not on the first. Of these fully 100 were cases in which the pulp was entirely removed at the time, and in about 200 more the pulp was drilled into and partly removed, and a devitalizing agent used to complete the destruction. *Second.* In almost all cases of single-rooted teeth the pulp was entirely removed at the time. *Third.* No sensation of pain was felt from the devitalizing agent applied after using cataphoresis. *Fourth.* Not a single case as yet of a dead pulp from the use of cataphoresis. *Fifth.* No difference has been noted in the time required for varying concentrations of cocaine or any other agent. *Sixth.* The average time required for all cases was about thirteen minutes. *Seventh.* The amount of current tolerable is determined by the effect of the cocaine on the pulp tissue, and not in the dentin, in a case of unexposed healthy pulp. *Eighth.* The resistance through the wet dentin varies all the way from a few

thousand to five hundred thousand ohms. *Ninth.* The amount of current tolerable has been found to vary from one two-hundred thousandth to two-thousandths of an ampere, the average being less than two ten-thousandths at the beginning of the operation and four ten-thousandths at the finish. Of course, where pulps were devitalized a very much stronger current was used for the finish, though seldom more than that amount was used where the continued life of a pulp was expected. *Tenth.* There are constant symptoms that will give any indication of the amount of current flowing. Each case has a different pain limit. Hence the absolute necessity of using a milliamperemeter. *Eleventh.* No effect has ever been noted in the tissues beyond the tooth, except where a very strong current was used, then slight periostitis.

What deductions can we make from these results? We know that when a solution of cocaine is applied to the dentin of the tooth, under the positive pole, with a negative elsewhere, we do get anesthesia, not only of the dentin, but of the pulp tissue, if applied long enough. Will the current alone produce this condition? No. Then it is not the current that does the work. Will the medicine alone produce this condition? No. Then it is not a simple osmosis. Does the current so applied produce any change in the cocaine solution? Yes, it cannot pass through it except by changing it.

Is there a transmission of matter in this solution under these conditions by simple osmosis? Probably very slight. Is there a considerable transmission of matter at all? Yes, by the migration of the ions. Do these ions produce currents which carry the unchanged medicine with them? Theoretically yes, but practically very slight. Are these currents produced in both directions? Yes. Can an osmosis be produced from a negative to a positive pole? Yes, in some solutions. (An analogous phenomenon is observed when a globule of mercury is placed between two electrodes in water, the globule goes to the positive pole.)

According to the older theories there was supposed to be a physical force exerted in some manner by the electric current applied in this manner, and this idea has its advocates yet. There is a newer theory, however, which is made by its introducer, Nernst, of Göttingen, Germany, to explain all the phenomena. He thinks that there is no transmission of matter except the ions themselves. Now to follow this argument in this connection, if it is the force of osmosis on which we are dependent, what will be the effect of new molecules of hydrochlorate of cocaine being formed in the pulp tissue by electrolysis on the osmosis from without? Of course, if such be formed, it would diminish the difference of concentration within and without the pulp chamber, and by doing so would lessen the force of osmotic pressure, which is in direct proportion to the difference of concentration at various points. In this case it would not seem that the current was helping the process. It is certain that we are not depend-

ent on a difference of concentration for the development of the force that carries the cocaine through the tissue. Do we know that a medicament can actually be forced into the pulp at all? Yes, in many ways. I have put sulphate of morphin with the cocaine, and after extracting the pulp on a broach been able to detect the morphin by the nitric acid test under the microscope. I have killed a frog in twenty minutes with sulphate of strychnin with the current, when neither the current alone nor the medicine alone, left for a considerable time, produced any noticeable effect. I do not believe the medicine was in any case carried in as the original chemical species, but was charged by electrolysis. And further, with the conditions under which we use cataphoresis, I believe the forces upon which we are dependent are the dissociation of the molecules and the increased energy of these dissociated products. These ions by their migration and by the new chemical species they form are capable of producing perfectly analogous phenomena under different circumstances, but under analogous conditions. A good example is this experiment I have here. In these three test tubes we have respectively a solution of Na SO_4 , SO_4 , and water; the water is spring water and the sulfuric acid solution about 1% concentration. The positive pole of the electric current is attached to the Na SO_4 solution and the negative to the water, and the tubes connected with pieces of asbestos. Now if the osmosis of the $\text{H}_2 \text{SO}_4$ is going to be accelerated by the electric current we shall soon see the litmus paper in the water turn red. If, on the other hand, the process of electrolysis is stronger, it will dissociate some of the Na SO_4 and the Na ion will travel through the $\text{H}_2 \text{SO}_4$, probably with accompanying reaction, and appear at the negative pole in the water solution, producing an alkaline solution, which is the action we get. Of course the sodium acts on the water, liberating hydrogen.

The final goal is of course to diminish the time. I do not believe this will be done by seeking directly for a substance that has a high osmotic pressure, but rather in seeking for a reaction that will produce the most active ion. It is true, however, that substances which have a high osmotic pressure have good conductivity. Since the amount of current we can use is limited by the pain limit of the tissue, and the amount of electrolysis is a constant expression of the strength of current, of course the amount of chemical energy we can liberate is fixed, and we cannot hope to change this unless we can change some of the laws of either *physiology*, *electrolysis* or *chemistry*. We have left these unfixed conditions to modify, viz, to select the ions with greatest migration velocity and which themselves or the compounds they will form will produce greater physiological effect upon the tissue for the same unit of concentration in the tissue. There is no reason why great advancement should not be expected in this direction, and it is my opinion that when it does come, it must come along this line.

Digests.

RELATION OF DENTAL OPERATIONS TO PREGNANCY.
By Frank Elliott, M.D., Kansas City, Mo. It is with genuine pleasure to the American women that the old saw, "A tooth for every child," is becoming an obsolete phrase. We now see the well-developed child-bearing woman of forty years of age with a set of serviceable teeth, a good digestion, and a well-balanced nervous system. We are largely indebted to the careful and painstaking dentists for this changed condition. It is only within the last decade that dental work was allowed on the pregnant woman, not from any known injury to her, but simple because she was hedged about by superstition and ignorance. I am speaking now of the great masses of women, not of the favored few who live in the large cities and who have the advantages of a more thorough intercourse with the world. It was formerly supposed that to taste of her own blood would cause a woman to abort; an extraction of a tooth was, therefore, to be avoided.

Abnormal conditions of the mouth and teeth during pregnancy may occasion considerable distress and inconvenience. The gums may become soft, and a condition known as "white caries" is often seen in the teeth; in other cases the gums are reddish in color and are retracted, exuding a thin fluid or pus from around the neck of the tooth. This condition does not imply neglect of cleanliness, but results from the altered secretions of the oral and buccal cavities. The saliva early in the day is of an acid reaction, and the more profound and long-continued the nausea, the more acid becomes the saliva and the contents of the stomach. These conditions have a potent influence upon the development of caries of the teeth. Softening of the dentin of the upper bicuspid and molar is sometimes observed, apparently because they are the teeth against which fluid is most forcibly ejected in the emesis of pregnancy.

Affections of the nerves of the face and teeth are often referred to pathological conditions in the mucous membrane of the stomach, and are sometimes purely reflex from an ulcerated cervix uteri. These conditions must be overcome by the appropriate remedies, and here is where the scientific dentist comes in to take most of the responsibility of the preservation of the teeth of these patients. It is the duty of every physician to send a pregnant patient to her

dentist for examination, and it is perfectly right and proper for a dentist to ask to be allowed to inspect the teeth of his regular clientele; your patients think more of both physician and dentist for these little courtesies extended to them. On account of its easy removal and non-irritating character, I would advise plastic filling. If the cavity is too large, or if from any cause the tooth cannot be saved, there is no valid reason why it should not be extracted. It is well to remember that the mother has no power to affect her offspring except physiologically. She does not have the power to deform the child at will, or change its hair from red to black, but she does have the power to affect its nervous system; what could be more irritating during the months of gestation than to have one or more teeth that are decaying or ulcerating? I do not know of an operation within the sphere of dentistry that could not be undertaken with perfect safety. Of course, there are some responsibilities to be assumed; an ulcerated tooth has been known to produce an abortion; after a night of suffering, when the pains become almost unbearable, the patient decides to have the tooth removed. The uterus may have become dilated or dilatable, and an abortion well under way before the tooth was extracted, but the cause of the mishap is attributed to the dental work.

There is dilation of the heart cavities and hypertrophy of the left ventricle in the pregnant woman, and for this reason it is dangerous to give opium in any form to such patients. A dentist is not justifiable in performing an operation on a patient to whom morphin has been exhibited for the relief of pain, although it may have been given by the advice of the patient's physician. There are cases on record where this drug, under such circumstances, has produced death, and in the controversy or law-suit which follows the physician always has the advantage of the dentist.

Local anesthetics which contain more than one per cent of muriate of cocaine are dangerous expedients on account of their heart-depressant qualities. Dilatation of the sphincters of the body as a mode of resuscitation is dangerous on account of its reflex character. Chloroform or ether by the ordinary mode of inhalation, with the patient in a prone position, is the best form of anesthetic known at the present day. A dentist is justifiable in refusing to extract teeth from a patient with chorea or syphilis; the tendency to abort is paramount in such cases, and any exciting cause may precipitate

the trouble; of course it may be performed under the advice of a physician, and after a full explanation of its probable results. Dentists who follow these points should be protected by testimony in a court of law against the charges of malpractice.—*Medical Arena.*

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PYORRHEA ALVEOLARIS. By J. W. Wassall, M.D., D.D.S., Chicago. Read at Illinois State Dental Society, May, 1897. The statement was made at a recent meeting of the Chicago Dental Society that more human teeth were lost from this malady than from dental caries. The idea to me was a startling one, but a little reflection convinced me of its reasonableness. It might be more true to the facts to say that caries was the arch enemy of childhood and youth, while pyorrhea alveolaris was the destroyer after thirty.

The disease of pyorrhea alveolaris may be discussed by dividing into the following six general headings: 1. Definition. 2. Symptomatology. 3. Pathology. 4. Etiology. 5. Treatment. 6. Prophylaxis.

First, definition. The dictionaries of medical and dental science give very inadequate definitions. Black, American System of Dentistry, Volume 1, defines phagedenic pericementitis as a specific, infectious inflammation having its beginnings in the gingivæ, and accompanied with destruction of the periodental membranes and alveolar walls. Dr. Black's paper at Quincy in 1882 was the first real attempt at a scientific description of this disorder before this society. His appellation of the disease given at that time seems more appropriate philologically and scientifically, but common usage has given the term pyorrhea alveolaris its stamp of greater authority.

Second, symptomatology. There are two classes of symptoms—subjective, or those experienced by the patient, and objective, or those obvious to the operator. The most prominent subjective symptom is pain. It may be localized in the alveolar tissue or be reflex in remoter parts of the cranium, face or neck. It will vary in degree from a trifling uneasiness to intense suffering. The tooth, the socket of which is affected, may be elongated or tender to percussion. The patient is frequently but not always conscious of a discharge from the alveolus, having a fetid odor or taste. The patient will usually give a history of periods of comparative comfort followed by marked exacerbation of all the painful symptoms, but each attack leaving the tooth a trifle more loosened. The objective symptoms during an acute attack of pyorrhea alveolaris will be

the characteristic signs of inflammation—heat, redness, pain and swelling. If the disease is of long standing a deficiency of alveolar and of gingival tissue. The existence of so-called "pockets" about the gingival line is pathognomonic and the infallible diagnostic sign of the disorder. The extent and depth of pockets varies from a slight solution of continuity in the peridental tissue to a complete severing of the root's connection from its socket. Pressure on the gum over a pocket will produce a discharge of pus. The use of the sound or probe will reveal to the educated digit the presence of a deposit of calculus upon the cementum. These symptoms are not always constant, but are present in varying degrees according as a case is in an active or passive stage.

Third, pathology. I desire to call attention to a condition described by many writers which has not received a proper interpretation. I refer to the occasional presence of a deposit of calculus on the root having no external communication with a pocket or gingival margin. The statement is sometimes made that such a condition occurs and that it gives rise to an acute attack with all the usual symptoms except the absence of a connecting pocket. It seems highly improbable from what is known of the formation of pockets in pyorrhea alveolaris that this condition could arise *de novo* as described. Is it not more reasonable to attribute the condition to nature's attempt to close up a pocket after the subsidence of an acute attack by which the deep end of the pocket—the bottom of the pocket so to speak—is left as a cul-de-sac containing its scale of calculus on the roots, together with the several varieties of pathogenic bacteria which will ultimately give rise to further outbreaks of the acute attacks? A condition of the gravest consideration under the head of pathology is the wasting of the alveolar process. This is due to destruction of the peridental membrane which undoubtedly has occurred wherever pockets have formed. The peridental membrane is the alveolo-dental periosteum, being the periosteum of the alveolar wall next to the root as well as the periosteum of the root. Its disappearance would deprive the process at such points of nutrition and would sufficiently account for the wasting of the bony structure.

Fourth, etiology. The cause of pyorrhea alveolaris is still involved in mystery, and thus far nothing conclusive has been established. There seem to be advocated, first, that the cause of the dis-

ease is purely local; second, that it is constitutional; and third, that it is of local and constitutional origin combined. The argument so often advanced that the disease must be purely local, because local treatment will result in its disappearance, would at first glance seem to be conclusive. But a closer examination of this claim shows its fallacy. For by the same reasoning eczema, the local manifestations of which are removed by topical treatment, could be called a local affection, when its constitutional origin is a well-known fact.

A more satisfactory cause to my mind is proposed by Drs. Peirce and Kirk, viz., the uric acid theory, but the value of their claims is still speculative. While I do not deny that their claims may be correct, I am not prepared to accept their proposition that the deposits of pyorrhea alveolaris are equivalent or analogous to the calcareous deposits of the uric acid diathesis. Dr. Black has demonstrated by his analyses that uric acid may be present in all deposits upon the teeth, salivary or serumal, irrespective of the fact of the presence of pyorrhea alveolaris. If the serumal deposits of pyorrhea alveolaris were identical with the calcareous deposits in the joints of gouty or rheumatic subjects, why is it that the deposits on the roots of teeth never occur as loose nodules in the periodontal membrane? I wish to assert that I am unconvinced that pyorrhea deposits originate *de novo* unless situated in pockets. The chemical analysis of any calculus taken from an individual of the uric acid diathesis—and the uric acid diathesis is very prevalent—would naturally reveal the presence of uric acid. Would you infer that stone in the bladder and its accompanying irritation were due to gout because analysis yielded uric acid crystals? I give these few objections to the uric acid theory, not because I disbelieve in it entirely, but to show that the ground upon which its advocates stand is not yet assured.

The causative agency of the calculary deposits in pyorrhea has always been a matter of doubt. While it is almost unquestioned that a pocket precedes the formation of a deposit, yet it is plain to every observer that the presence of serumal calculus aggravates all the symptoms and accelerates the progress of the disease. Salivary calculus is important as a predisposing cause of pyorrhea alveolaris, in that it establishes a lesion of the gingiva, a condition favorable to the development of the disease.

I wish to suggest a constitutional disorder which seems in my judgment to bear an important relation to this affection. It is eczema.

All observers seem to agree that the scrofulous tendency or dyscrasia is very favorable to the development of pyorrhea alveolaris. Scrofulous persons are invariable subjects to impairment of the integument or of the tegumentary appendages. In one family it will be early failing of the hair bulbs; in another dryness of the cuticle. All such are tegumentary degenerates, and I see very few cases of pyorrhea alveolaris in which I cannot find some indication of eczema.

The infectious character of pyorrhea alveolaris has been noticed by many observers. Dr. Black, in the article before referred to, states it as his belief that the bacteria which are found to abound in the discharge stand in an important causative relation to the disorder. So far as I can learn, no one species has been isolated which will give rise to the disease by inoculating the peridental membranes of the lower animals. There is here open a fruitful field for study and investigation. The disease is in all probability caused by a germ or its toxines, and it is only a question of time when the particular species will be demonstrated.

Fifth, treatment. The constitutional origin of pyorrhea alveolaris is so much involved in mystery at this time that there is no basis for systemic treatment. So far as I am able to learn, there is also not even an empirical method of systemic treatment of any special value. We are therefore driven to the other alternative and forced to rely on local treatment until such time as further investigation shall have revealed the truth to us. For the same reason local treatment is carried on in the dark, but we know that in this direction only can we obtain any really satisfactory results.

When a case presents it should be the first duty to make a thorough examination. The gingivus of each tooth should be carefully sounded for pockets and when one is found its location, depth and width should be accurately indicated on the diagnosis chart. The treatment should consist first, of the removal of calculus; second, medication; third, the securing of rest and protection. The location and removal of calculus is often one of the most complex and trying operations the dental practitioner is called upon to perform. There is nothing I can add to what has been said upon this question. Each must put forth his best skill and ingenuity to accomplish the end sought. It is perseverance, educated digits, and concentration of mind on the cutting edge of the instrument which should be depended upon. Cocain anesthesia may be used in painful cases.

In some examinations of cementum of teeth affected with pyorrhea alveolaris, reported by Dr. George B. Clement at the World's Columbian Dental Congress, he asserts that the superficial lacunæ and canaliculi become solidified by calcific deposit. It therefore becomes a matter of much importance after removing the serumal calculus to also take away this layer of solidified cementum. Indeed, it has seemed to me that success in obtaining adhesion of the new growth of pericementum to the cementum is entirely dependent upon the ability to present a freshly exposed surface of normal cementum to the new granulations.

All operations should be accompanied with a free use of a powerful stream of warm water from a small-nozzled syringe. Medication should consist at the first visit of, first, disinfection to remove all traces of bacteria; second, of a vigorous escharotic to destroy pernicious tissue and act as an alterative and establish a healthy action, which is the proper surgical treatment for any ulcerative surface.

To secure rest cusps should be shortened with the corundum, and if there is any loosening a splint should be adjusted—metallic bands, pure silver or gold preferably, or waxed silk ligatures.

The mouth is such a favorite habitat for the myriads of pathogenic bacteria that it would be eminently desirable, if it were possible, to seal up the external openings of pyorrheal pockets. I have not as yet had any experience in such a procedure, but I believe it is feasible and some effective way should be employed.

Subsequent treatment should be made with the utmost care not to break up any reparative processes which have begun. Failures are often occasioned by careless probing or uncalled-for force in injecting medicaments at this stage. Search for deposits overlooked at the first treatment should not be made unless there is positive evidence of their presence by failure of the pockets to close. Disinfectants and stimulants at varying intervals of from one to seven days are indicated until a cure is obtained.

As every patient once afflicted with this disease is subject to a recurrence, prophylactic measures become an important consideration. Maintaining a robust general health, vigorous friction with tooth-brushes regularly applied at bedtime and on arising—having four brushes in use so that they are not water soaked when employed—and the rubbing continued for three or four minutes, to be followed with a disinfectant mouth-wash—the fluid to be retained in the

mouth three minutes—are the measures from which I have observed good results. Pyorrhea subjects should have the mouth examined for pockets every three months.—*Dental Review, June, 1897.*

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PRACTICAL THINGS IN PRACTICE. As a covering and protection for slight wounds on the hands it has been recommended that an application of collodium and Peru balsam (1:10) gives excellent results. This will remain intact and be perfect for days; and washing the hands with soap and warm water does not disturb it in the least. It is easily prepared and yields satisfactory results.

A low fusing metal, which is also very hard, can be produced as follows: 48 parts Bismuth, 13 Cadmium, and 19 Tin. This metal is useful in crown and bridge work, and fuses at about 200 F.

A compound for modeling can be made by using marble-dust and adding to it a sufficient amount of glycerin to produce a moldable material.

In the event of pulpitis or inflammation of the pulp, cleanse the cavity by using warm water and apply a small amount of pulverized thymol over the pulp. If the pain still continues, add one drop of chloroform to the applied drug and immediate relief will be afforded.

There is yet needed a metal which will take the place of gold in the making of bases for dentures. Many have advocated aluminum, but this metal does not favor us with the desirable properties of gold. A new metal which seems to have the requisites of the royal metal, and which is less costly, has of late attracted considerable attention in Germany. It is composed of Silver 3.53; Platinum 2.40; Copper 11.71. This metal is elastic and takes a most brilliant polish. It is not acted upon by the fluids of the mouth and answers the same purpose as gold. Dentists who are interested in a substitute for gold will do well to experiment with this formula.—Trans. by Dr. B. J. Cigrand, from *Zahnaerztliches Woch.*, June, 1897.

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BRIEF STUDY OF CHLOROFORM ANESTHESIA IN RELATION TO SEASONS AND CARBON DIOXID. By T. R. Evans, M.D., Charleston, W. Va. The latter portion of winter and the spring months seem to furnish the most cases of death. Then the air is heavy with moisture, while the cold chloroform is less easily vaporized and exhaled; hence the greater liability to tissue saturation unless great care is used. The chloroform may be

condensed in the lungs like dew. At all times allowance must be made for the specific gravity of chloroform, and during spring for the largest amount of carbon dioxid exhaled, or there is danger of double anesthesia. Warming the chloroform at such times should be more generally resorted to.

The hypodermic of morphin is a doubtful expedient, but dietetic management and the time of day for operating are important. An empty stomach, not altogether for mechanical reasons, and the early morning hours, are the conditions of election. A drink of whisky-and-water half an hour before the operation is a salutary measure—whisky at once and for some time lessening the exhalation of carbon dioxid, while water increases the production of oxygen.

The muscularity of the subject increases the production of carbon dioxid. Hence the comparative ease and safety with which persons in the opposite condition are chloroformed. Women in labor, excreting some of their hitherto superabundance of carbon in the lochia, are proverbially safe against chloroform casualties, due allowance being made for other favoring conditions. Carbon dioxid is incompatible with the early stage of chloroforming.

The administration of milk toddy before giving chloroform is contra-indicated, as milk generates carbon dioxid.

Physiological refinements should not be tabooed in considering so important a subject.—*Medical Record, June, 1897.*

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INTERNAL CARIOSIS. By Dr. W. H. Craig, Oakland, Cal. In examining a lady's tooth I found a minute cavity in the point of a superior cuspid. Attempting to bur out the cavity preparatory to filling, the enamel came away, separating at the neck, and leaving the dentin adhering to the root. The dentin was soft and soon became very painful. The root was also soft and was extracted. The enamel was unbroken, was white and very thin. In more than thirty years' practice this has been the only case of the kind which I have seen.—*Items of Interest, June, 1897.*

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PERICEMENTITIS FROM PHOSPHORIC ACID. By Dr. S. J. Spencer, Harriman, Tenn. I lately read somewhere that a dentist secured stronger adhesion of his oxyphosphate of zinc fillings by first painting the walls of cavity with the liquid. Thinking this a capital idea, and having a root to crown (a healthy root, which for ten

be felt. Next comes the trachea, two or three rings of which are above the isthmus of the thyroid body, whilst six to eight rings in all are above the manubrium sterni. The isthmus of the thyroid body is in adults about half an inch broad and overlaps the third and fourth rings of the trachea, leaving a space of about a quarter of an inch between it and the cricoid; in this region the trachea is opened in *tracheotomy*. When the opening is extended upwards through the cricoid, as well as the upper rings of the trachea, the operation is called *laryngo-tracheotomy*. The trachea as it descends from the thyroid isthmus recedes from the surface. Above the thyroid isthmus the air passage is quite superficial, being covered only by skin and fascia and overlapped by the sterno-hyoid muscles; but below the isthmus the trachea is much deeper and more difficult to reach, becoming covered by the sterno-thyroid muscles, inferior thyroid plexus of veins, branches of the inferior thyroid arteries, the thyroidea ima (when present), and sometimes the left innominate vein just above the sternum.

Laryngotomy. This operation affords the easiest and most rapid way of opening the air passage. It is therefore *par excellence* the operation to be performed in an emergency, as for instance when suffocation is imminent from the impaction of a foreign body at the entrance of the larynx. Under such circumstances a knife should be plunged in immediately above the cricoid cartilage, dividing the skin and subjacent crico-thyroid membrane transversely. When the operation can be performed deliberately, a vertical incision an inch long should be made in the middle line, opposite the space between the thyroid and cricoid cartilages. The crico-thyroid membrane having been exposed is opened transversely by inserting the knife just above the upper margin of the cricoid, so as to avoid the crico-thyroid artery and to make the opening as far as possible from the vocal cords. A laryngotomy tube (compressed from above downwards so as to fit the crico-thyroid space) is then inserted and tied in with tapes. It is but seldom that this operation is required, as when a deliberate operation can be performed it is preferable to perform tracheotomy.

Tracheotomy. This may be required under the following circumstances: A. To relieve dyspnea due to: (1) Diseases causing obstruction to the passage of air through larynx or upper part of trachea, such as laryngitis, ulceration of larynx, tumors of larynx, etc. (2) Foreign bodies, scalds of larynx, etc.

years had been kept sweet and dry by a gold canal filling), I applied the method. Result: A raging pericementitis which lasted several days. The acid had penetrated the foramen before the filling material had a chance to absorb it.—*Items of Interest, June, 1897.*

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QUICKLY MADE MATRIX FOR CEMENT, AMALGAM AND GUTTA-PERCHA FILLING. By Dr. Theo. F. Chupein, Philadelphia. Cut a piece of thin German silver plate, such as is furnished for matrices, about one-eighth of an inch wide, or narrower, and about one-half inch larger than is necessary to encircle the bicuspid or molar tooth you may be about to fill. The rubber-dam having been applied, the cavity prepared, and all things ready for the insertion of the filling, pass the strip of metal around the tooth, seizing the two ends with flat-nose pliers, and draw it up close to the tooth, in the same way as you would do if you were making a band for regulating purposes. When closely fitted remove it and heat the ends, and while hot place on one end a film of hard or adhesive wax. Now replace the band on the tooth, and by heating the noses of the flat pliers, the ends are again seized. The heat of the pliers melts the hard wax which was placed on the ends of the band matrix. The matrix is held with the pliers until the wax is thoroughly cold. When removed the matrix hugs the tooth closely, and the wax is sufficiently tenacious to hold it in place until any plastic filling may be inserted.—*Dental Off. and Lab., July, 1897.*

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ORAL SURGERY. By Edmund W. Roughton, B.S., M.D. (Lond.), F.R.C.S. Eng. Operations on the Upper Air and Food Passages. Before describing these operations it will be well to recall the anatomy of the middle line of the neck. Running from the chin to the hyoid bone, there is a raphé between the genio-hyoid muscles; next in order (proceeding from above downwards) is the thyro-hyoid membrane, which is incised in *sub-hyoid pharyngotomy*; then comes the notch in the thyroid cartilage (*Pomum Adami*), which can easily be felt in adult males, but is almost indistinguishable in fat children; in *thyro-chondrotomy* the incision passes through the middle line of this cartilage; immediately below it is the crico-thyroid membrane through which the opening is made in *laryngotomy*. The cricoid cartilage comes next, opposite the fifth cervical vertebra; it is a valuable land-mark, as it can always

under the opposite conditions great trouble may result in one or more of the following ways: (1) The hyoid bone or thyroid cartilage may be mistaken for the cricoid in a fat-necked child. (2) The incision may be too short, embarrassing the later stages of the operation. (3) Hemorrhage is always a source of trouble. Arteries should be tied, veins unless large may be left, as they will cease to bleed when the trachea is opened. (4) The interval between the sterno-hyoid muscles may be missed, and the dissection carried to one side of the trachea. (5) The knife may go right through the trachea and enter the esophagus. The vertebral column has been seen at a post mortem examination scored with the knife. (6) Blood may enter the trachea. This is best avoided by tying all vessels and by thoroughly exposing the trachea before it is opened. Should blood enter the trachea, the patient should be turned over and the head lowered so that it may run out. (7) The tube may be passed between the trachea and the fascia covering it. This may be avoided by fully exposing and freely incising the trachea before attempting to insert the tube.

After-treatment. The air in the room must be kept warm and moist. The tracheotomy tube should be frequently cleansed. After a few days a rubber tube must be substituted for the metallic one, as the latter is apt to damage the trachea. The tube should be dispensed with as soon as the normal passage for air has been restored. It is usually advisable to remove the tube for a few hours during the day before dispensing with it entirely. When a tube has been worn for a long time difficulty may be experienced in doing without it, owing to adhesion of the vocal cords, granulations in the trachea, or paralysis of laryngeal muscles.

Laryngo-Tracheotomy. This operation differs from tracheotomy in that the incision is prolonged upwards through the cricoid cartilage. It is sometimes necessary in children when the space above the thyroid isthmus is not large enough.

Thyro-Chondrotomy.—This operation (often called *Thyrotomy*) may be required for the removal of a laryngeal tumor or foreign body. An incision is made in the middle line from the hyoid bone to the cricoid cartilage. The thyroid cartilage is then divided accurately in the middle line, great care being taken to avoid injuring the vocal chords. After removal of the growth or foreign body the lateral halves of the cartilage are accurately sutured together.

B. For the removal of foreign bodies and tumors.

C. As a preliminary to operations on the mouth attended with risk of entrance of blood into larynx, e. g., removal of tongue, upper jaw, etc. Tracheotomy is preferable to laryngotomy because: (1) It does not interfere with the integrity of the larynx. After laryngotomy the voice is sometimes impaired or lost, owing to inflammation extending to the crico-thyroid or crico-arytenoid joint, or to contraction of the crico-thyroid membrane. (2) The tube is more easily managed in tracheotomy than in laryngotomy. (3) Subsequent manipulations for the removal of foreign bodies in the larynx or trachea can be more easily conducted. (4) Laryngotomy is inapplicable in children, owing to the small size of the larynx.

The operation may be performed either above or below the isthmus of the thyroid; for the anatomical reasons already stated the high operation should always be performed when possible. Chloroform should be given, especially in children, as their struggles are apt to interfere with the operator. In adults an anesthetic is not necessary as, after the first incision, no pain is felt. A small pillow should be placed behind the neck to render the larynx prominent. An incision an inch and a half to two inches long is made exactly in the middle line from the cricoid cartilage downwards; the interval between the sterno-hyoid muscles is found, and the dissection carried on between them, avoiding or, if necessary, tying any distended veins which make their appearance. The first two or three rings of the trachea and the isthmus of the thyroid will now be exposed. The latter may be drawn downwards if there is not enough room; this may be facilitated by dividing the fascia which connects the isthmus to the cricoid; if necessary the isthmus may be notched or divided in the middle line. The trachea having been clearly exposed and all arterial hemorrhage arrested, a sharp hook is thrust into it just below the cricoid; the first two or three rings are then divided with a knife, the back of the blade being directed downwards. The wound in the trachea is held open with the tracheal dilator and the outer part of the tracheotomy tube is inserted; the inner portion is passed in immediately afterwards, and the whole apparatus fixed with tapes tied round the neck.

Difficulties and Dangers of Tracheotomy. When the operator has plenty of time, good light, skilled assistance, and an adult patient with a thin neck, no difficulty will be experienced, but

be postponed? According to our experts in nitrous oxid anesthesia, there is no reason why the gas should not be given as soon as the patient is resuscitated. It would perhaps be better not to undertake the extraction of a number of teeth, and it would be advisable not to induce a very deep anesthesia, but for an ordinary extraction no postponement is necessary.

What are the best means for resuscitating a fainting patient? The treatment consists in removing the cause of faintness and in restoring the action of the heart. The patient should be placed flat on the back, doors and windows should be thrown open, and the dress loosened. If the patient can swallow, a diffusible stimulant, such as sal volatile or eau de cologne, should be given, a teaspoonful in half a glass of water. Smelling salts should be applied to the nostrils, and artificial respiration should be resorted to, with nitrite of amyl held to the nose in extreme cases. Cases in which patients faint at the moment of or during extraction must be judged on their individual merits and left to the discretion of the operator.—*Brit. Jour. Dent. Sc., July, 1897.*

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BRITISH TEETH ON THE DOWN GRADE. By Chas. Fox, L.D.S. Cause 2. It is difficult to name any one cause of sufficient importance to rank alongside the fivefold increase in the use of sugar during the present century. I will therefore couple the insufficient quantity of milk in the dietary of infants and young children, and the undue proportion of starch foods. The general statement that "bottle babies" are on the increase, and those fed from the maternal fount decreasing, will scarcely be contradicted. Failing Nature's home supply, cow's milk, diluted and sweetened, is used; but most of it is miserable stuff. Only one-quarter pint of milk per day is the average used by each inhabitant of London. This means far less in the poorer districts, and in scores of rural, even pastoral neighborhoods, milk cannot be obtained. Yet nothing else will serve as an efficient substitute during the bone and tooth-forming periods, and perhaps more depends on the quality of the original tooth substance than any amount of care in afterlife.

To arrive at a decision as to the natural and best food for man, let us glean a little in other fields. Our cousins, from marmoset to anthropoid ape, find in fruits and nuts a sustenance that at all events produces perfect dentition. Place them in confinement, however,

Sub-Hyoid Pharyngotomy.—In this operation the pharynx is opened by incising the thyro-hyoid membrane. It is very seldom performed.—*Brit. Jour. Dent. Sc., July, 1897.*

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FAINTING AND TOOTH-EXTRACTION. By William Rushton, L.D.S., Eng. The following remarks are suggested by a question recently asked of me: "Is a dentist justified in taking advantage of the unconsciousness produced by a fainting fit to extract the tooth of a patient?" At first sight it may not seem an easy question to answer. The patient is in a condition of anesthesia; why not take advantage of it and so save pain? The means taken to revive a patient are by stimulating peripheral nerves; why not employ the extraction of a tooth as a peripheral nerve stimulant, and so "Contrive a double debt to pay"? These are plausible arguments, and are brought forward by those who advocate this method.

I consider, however, that the answer ought to be a decided negative. Let us consider for a moment what a faint is. Fainting or syncope is a state of suspended animation, due to a sudden failure of the action of the heart. The cause of the unconsciousness then, is a very grave one and differs markedly from the unconsciousness produced by anesthetics. Syncope may be due to any condition which interferes with the action of the heart, whether acting (*a*) intrinsically, such as fatty degeneration, tight lacing, or chloroform poisoning; (*b*) nervous conditions, such as fear or grief; (*c*) conditions of the blood, such as hemorrhage or chronic anemia; (*d*) or from a combination of causes.

Now in answer to the first argument, "Why not take advantage of the unconsciousness?" Although the brain is asleep, the nerves are very much alive, the reflexes are not abolished, and therefore the shock to the patient when the tooth is extracted may be very acute. It may, in fact, be fatal, and in that case the questions asked at a coroner's inquest may be very unpleasant. Our first duty to our patient is to restore consciousness. With regard to the second question, as to whether the extraction would not act as a nerve stimulant, the reply is that it would. But there is such a thing as overstimulus, which means shock, and the extraction of a tooth comes under this head.

Is there any objection to administering nitrous oxid gas to a patient who has just recovered from a faint, or should the operation

THE DIFFUSIBILITY OF COAGULANTS IN DENTIN.
By E. Lawley York, D.D.S., Chicago. Read at Illinois State Society, May, 1897. These experiments were made in various ways to show that carbolic acid will diffuse through dentin, in freshly extracted teeth that at the time of extraction were normal, also in teeth freshly extracted that had putrescent pulp canals; in the latter I found that there was slightly more rapidity of diffusion.

After opening into the pulp-chamber from the lingual or coronal aspect, according to the tooth that I was treating, and after gaining sufficient room to pass a hypodermic needle into the pulp-chamber, thus avoiding cutting away the tooth structure unnecessarily, I removed the pulp, dried the canal or canals, as the case might be, and sealed the foramen at the apex with gutta-percha. I then injected a small quantity of a 95 per cent solution of carbolic acid, which had been previously colored with a minute quantity of fuchsin, sufficient to fill the pulp-chamber and about two-thirds of the canal, thus avoiding any oozing out upon sealing the crown with gutta-percha. I then wrapped the teeth in wet gauze and placed them in a receptacle I had made that would keep them at about 98° F. My aim through my experiments has been to make them as nearly as possible under the same conditions that are met with in the mouth. The earlier experiments were generally with teeth left in the incubator twenty-four hours at least, but later I found that carbolic acid would pass through the dentin as far as the cementum in eighteen and one-half hours.

On taking them out of the incubator I made cross-sections to preserve the bulk of the tooth for reference. In making a longitudinal section the tooth would be spoiled and only the section left; so that I should not have been able to show you the remaining portion from which the section was made. These were all mounted in Canada balsam, and show that the colored carbolic acid has passed entirely through the dentin.

The next series of experiments consisted in placing in the canals and pulp-chamber as much carbolic acid as would be used in the ordinary treatment of a tooth. After sealing the teeth I placed them in a bag that was tied to the nozzle of a faucet, and water was allowed to flow over them for two or three hours. The cementum was then ground off on two sides of the root, washed again, and the teeth suspended in water nearly up to their anatomical necks. The

and feed on sopped bread and cooked foods, and they also develop caries. Man, like his nearest relative, is evidently of tropical origin. There, before even the stone age, when he made flint instruments, and long before the bronze and iron age, when cooking utensils were possible, he regaled himself on bananas, apples, pineapples, dates, figs, and possibly borrowed a few birds' eggs, and the flesh of any animal within his power. But it was not until long ages after, that, emigrating northwards and finding cereals and pulses had to supplement the smaller nourishment of our acid fruits, he learned all our lecturers tell us of the value of heat in the preparation of starch foods.

That the world must feed on wheat as its staple diet is often accepted as a truism, but the fact that bananas feed 60 people to the acre, against a possible five under wheat culture, is worth remembering. Some day, perhaps, our superexcellent milling machinery, which produces that tenth-rate diet, white flour, will pass away and the sweet fruits of the tropics form the basis of our national food. Already tens of thousands of tons of bananas, the richest nitrogenous fruit, are consumed here, and no better addition to a child's bill of fare can be named than a few of these daily. Sugar, as we found, is craved, and it is because man's natural food, human milk and tropical ripe fruits, contain it in such abundance, but elaborated as no refiner on earth can do.

A few years ago Dr. Densmore threw a bomb-shell among the vegetarians by a series of articles against the use of all starch foods. He showed very cleverly the unsuitability of starch for man's intestines, how the stomach simply has to act as passer-on and its vital forces are wasted; how the teeth are directly exposed to decay by the presence of such readily fermenting particles, and the arteries prematurely aged by the undue proportion of earthy salts in cereal foods. Better meat than wheat, better milk and eggs than potatoes and rice, best of all, ripe, raw fruit and nuts.

From a dental point of view (and in a general way what is right there is right for the whole body), a perfect diet for children would be about as follows: Milk for the first year; milk plus ripe bananas, dates, etc., for the next period; and an occasional egg for the next period; and as the stress of life's work requires extra supplies, add meat, butter, cheese, nuts (the finest things for mastication), and let bread, potatoes and puddings take a place far away at the end of the list.—*Brit. Jour. Dent. Sc., July, 1897.*

water required. The next time I made this test I found carbolic acid would pass through in two hours.

A pulp which is in a congested or hyperemic condition, as the result of blows, exposure, thermometrical changes, ingress of micro-organisms, etc., is especially liable to disturbances resulting from blood stasis, owing to vessels both entering and leaving the same narrow foramen; the pulp is consequently in all probability subject to strangulation or stasis. The changes that now take place are not chiefly inflammatory, but necrotic, followed by secondary decomposition and putrefaction.

Here we have to do with the death of tissue occurring under special conditions, and resulting in the formation of coagulated albuminoids; but the coagulation takes place, not in a liquid, but in the substance of formed tissue elements, in cells and cellular or inter-cellular structures. If by reason of arrested nutrition, or by the action of chemical or thermal agencies, a definite segment of an organ undergoes death, this gives rise to coagulation within the tissue for the reason that the lymph contains fibrinogen, the cells contain fibrinoplastin, and from these substances fibrin is produced. Hence Cohnheim introduced the word coagulation necrosis to describe this special form of local death, *viz.*, necrosis with fibrin formation. Coagulation necrosis may also be found combined with other retrogressive changes, as fatty degeneration. What we are in the habit of speaking of as ulceration is not true ulceration in a pathological sense, but in its incipiency, at least, coagulation necrosis.

With this array of facts staring us in the face, what course of treatment are we to pursue? Nature is forming a coagulum. Should we not attempt to assist her by hurrying artificially those changes which she will in time produce spontaneously?

The cause, in my opinion, of so-called lame teeth, and it is also the clinical experience of a large majority of the best men in the profession, is imperfect root filling, not the use of coagulants. We so often see pulpless teeth in the mouths of our patients, without any root filling, when the whole crown is decayed away and the pulp-chamber and canals are reeking with purulent matter. The patient will reply upon inquiry that the tooth has never given any inconvenience. This condition can be accounted for only in one way, namely, that the foramen is obliterated or closed—encysted, if you like—consequently none of the septic matter can pass through

earlier ones I usually left twenty-four hours, but later I found that eighteen and one-half hours was sufficient time to detect carbolic acid in the water with the bromin water test.

In some cases I coated the whole of the tooth with sandarac varnish to prevent the possibility of any carbolic acid coming in contact with the tooth structure. Out of the many hundred tests made I did not fail in a single case to detect carbolic acid in the water.

Later on, at the suggestion of Dr. P. J. Kester, I selected sound teeth whenever I could and opened from the apex; slightly enlarging the foramen, and passing the carbolic acid in this way into the pulp-chamber, then sealing and coating with sandarac varnish, washing, etc. I suspended the tooth in water, crown down, thus excluding any possibility of leakage. The results are just the same—carbolic acid in the water.

The following experiment was intended to demonstrate that carbolic acid does not form an impenetrable coagulum at the orificial end of the dentinal tubuli, with their albuminoid contents. A tooth was taken that had contained a 95 per cent solution of carbolic acid in the pulp-chamber and canals for seventy hours. The canal was dried, and a saturated solution of sodium chlorid was inserted by means of a hypodermic syringe. The end was sealed with gutta-percha and then coated with sandarac varnish. This was allowed to dry, after which it was washed one hour with water. The tooth, which had been opened only at the apex, was suspended in water, crown down, about two-thirds of its length being immersed. In three hours I tested the water with a drop of a 25 per cent solution of argent. nitras, which resulted in large quantities of the chlorid of silver being thrown down, thus proving beyond a doubt that the coagulum formed by carbolic acid is not a barrier to the passage of other substances through the dentin, as has been so often stated.

Test for diffusion in coagulated albumen. I took a hard-boiled egg, sawed off one end, carefully removing first the yolk and then the remainder of the shell, placing the rest in a small wine-glass containing about one and one-half teaspoonfuls of water. I then poured in the space previously occupied by the yolk some carbolic acid. This was left for twenty-four hours, with the assurance from those who saw it that carbolic acid would never penetrate it. When I tested the water it was so loaded with carbolic acid that I had to pour it into a larger vessel to accommodate the quantity of bromin

the foramen and set up irritation and consequent inflammation of the peridental membrane. I do not think there ever was a so-called lame tooth caused by the septic matter contained in the canal or canals of a tooth passing through the dentin and cementum and setting up irritation and inflammation of the peridental membrane. It must pass through the apical foramen to cause such a condition.

Dr. Harlan, in a paper read before the Iowa Dental Society, says: "Carbolic acid melted was introduced into the pulp-chamber very carefully, to avoid getting any of the acid in the crowns or on the outside of them. After the lapse of twenty-four or forty-eight hours, respectively, iodin tincture was introduced in the same manner as first described above. If the iodin penetrated the dentin, it would pass through the cementum and turn the starch blue. It did not penetrate, hence no blue stain. Iodin is soluble in carbolic acid; carbolic acid is soluble in alcohol; both are coagulants. Carbolic acid is sparingly soluble in water, iodin is soluble in water 1 to 7,000 parts. This is one of the best experiments that could be used as a test for diffusion." Another series of experiments was made with the tincture of iodin alone. The results were negative.

To test the value of this experiment I ground a tooth and placed it in a bottle containing water. I took a small quantity, to which was added a drop of Lugol's solution of iodin. A few drops of the mixture were tested with dilute starch paste with no consequent reaction. This was precisely the same test that Dr. Harlan made, with the exception that the teeth in his case were intact. The reason there was no reaction was that the tinc. iodin combined with the salts of the tooth and formed iodids of the base with which it united, leaving no free iodin. Consequently we could not get the reaction of the iodin. Control test for the above. The same starch paste, with one-tenth the quantity of iodin and water, gave the blue iodid of starch very distinctly.—*Dental Review, July, 1897.*

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LITTER OF SUPERNUMERARY TEETH. By G. Lenox Curtis, M.D., New York. A patient aged 21 years, with a history of a full set of deciduous teeth and no extraction of the permanent set, presented herself, complaining of pain and some swelling in the jaw near the symphysis. Examination revealed the absence of the inferior left lateral incisor, the left central being slightly loose and tender on pressure. A slight space intervened between this and

the cuspid, the cusp of which was tilted forward and the apex well back, encroaching upon the bicuspid. Suspecting an unerupted lateral, a shell probe was passed through the gum and periosteum until a glistening subject resembling enamel was reached. The patient was so highly sensitive and hysterical that further examination was deferred until the time of operation. An incision in the gum was made directly over the tumor at the apex of the root, the periosteum was opened and laid aside so as to expose the contents. Here were found seven teeth nestling together in a cavity about the size of a denuded peanut. The roots were like the spokes of a wheel radiating outwards, some almost penetrating the gingival margin of the gum projecting above, while others were close to the lower border of the jaw. The cavity in which they were confined was perfectly smooth and without a sac. The roots of the teeth were pointed like tacks and were from one-sixteenth to a quarter of an inch in length, the crowns uniformly being an eighth. They closely resembled small inferior incisors of the temporary set, the crowns of only two showing clear enamel, the others being clump shape with a growth of yellowish color much resembling exostosis. On opening the teeth they contained a pulp same as a normal tooth. This beats my record by four at a single birth. Around one of the largest teeth was a sac, highly inflamed, filled with fluid, and from this, no doubt, the trouble arose.—*Dominion Journal, July, 1897.*

* * *

ACID TANNING. By Dr. F. S. Brooks, Martinez, Cal. About seven months ago, I commenced experimenting with a combination of chromic and sulfuric acids in the mummification of pulps, where portions remain in inaccessible root canals, and although the time may be too short yet to say what the permanent results will be, I have demonstrated one thing at least, and that is, that as a mummifying agent this combination is unequalled.

My first experiments were upon pieces of raw beef; I took some pieces of meat one-half inch or more in thickness, and placed on them a few crystals of chromic acid, then a drop or two of dilute sulfuric acid (fifty per cent) and left them over night. The next morning they were found to be perfectly tanned, being very hard and tough, of a yellowish color, and impervious to water; after several hours' immersion they were perfectly dry. A similar method is employed in some tanneries, where rapidity is the desideratum.

The next experiment was upon the pulp of a lower sixth year molar, the root portions of which I found it impossible to devitalize or remove. A few crystals of chromic acid were placed in the pulp chamber, then a drop of fifty per cent solution sulfuric acid added, which was worked into the root canals as far as the patient could endure. This was followed by a paste of iodoform and oil of cassia, and the tooth filled permanently. This was over seven months ago, and so far has given no trouble, except that for an hour or so after the operation there was some pain. This, I find, is the case in nearly all the teeth which I have treated in this way, but is usually not severe and lasts but an hour or so, and is caused, I presume, by the chromic acid (which has a remarkable tendency to spread) passing through the apical foramen.

I have treated quite a number of teeth in this way since, and have yet to record a failure. Recently, instead of using the chromic acid in crystal form, I have prepared a solution of equal parts chromic and fifty per cent sulfuric acids, which is kept ready for use in a glass-stoppered bottle.

A convenient way of applying is to take a glass tube, such as is used for a drinking tube, and by heating in the flame of a Bunsen burner, draw out to a fine point. This can be dipped into the acid and will take up a small quantity, which can be applied to the entrances of the canals. It is not necessary to flood the pulp-chamber, a very small quantity being sufficient. It is well to have two or three of these tubes, bent at right angles for convenience.

Great care should be exercised to avoid touching the soft tissues, as its effects are anything but pleasant; it can be neutralized, however, by a solution of bicarbonate of soda, which should be kept ready in case of accident.—*Items of Interest, July, 1897.*

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PERICEMENTAL ABSCESS. By Dr. D. D. Smith, Philadelphia. Read before Union Meeting at Old Point Comfort, Va., April, 1897. The form of alveolar abscess here denominated pericemental abscess, in so far as the author is aware, has heretofore never been described, if, indeed, it has been distinctly recognized. It is an affection by no means common, and yet it occurs with a frequency to demand recognition and careful description.

Whilst the cause or causes of this trouble may be difficult of explanation, when once developed its recognition and diagnosis is

comparatively easy and certain. The writer saw a number of cases of this affection before distinguishing between it and the ordinary form of alveolar abscess, and it required repeated failures in treatment before its distinguishing peculiarities were recognized. When once clearly differentiated it stands prominent and alone as a pathological condition of the teeth. It occurs on the pericementum of teeth with living pulps, as frequently perhaps as on those with pulps devitalized, and yet there are connected with it distinguishing characteristics clearly demonstrating its presence in either case. The abscess is never found at the apex of a root. It has no external fistula, neither is it accompanied by marked inflammatory manifestations nor by swelling. There is no discharge of pus from it, neither odor emanating from it in the canals of devitalized roots with which it may be associated; there is no marked increase of inflammation from medicating or tightly stopping such canals. It occurs more frequently in connection with upper than with lower teeth.

The seat of the abscess, from the author's observation, is always adjacent to some irregular formation in single-rooted teeth, and just above the bifurcation on the inner side of one of the roots of other classes of teeth. The sac of the abscess, if it may be spoken of as a sac, is always tightly adherent to the pericementum, and on extraction comes away entire on the root. The sac appears to be of an irregular glandular formation, not uncommonly having free globules of pus distributed over the surface of the glandular mass.

The diagnostic symptoms are, first, a dull, almost constant pain in the tooth and parts immediately adjacent; the root more or less loose, with pain increased markedly when pressure is made upon it in certain directions; the inflammatory symptoms are not at all commensurate with the pain nor with the apprehensions of the patient; little or no swelling attends it and no pus discharge. No relief is experienced from usual methods of treatment, as opening into the root or from external applications.

It is perhaps more likely to be confounded with pericementitis than with any other trouble, although there might be cases where it would be difficult to distinguish between it and root-absorption, especially in upper molars.

Differential Diagnosis. *Pericementitis*:—Pain on pressure acute, and alike in all directions. Looseness not great. Pain on tapping

very great. Pain increasing from the first, and accompanied with inflammation and swelling. Occurs generally in connection with devitalized teeth and roots. Some known local irritant the cause, as irritated or putrescent pulp, a blow, or wedging. *Pericemental Abscess*:—Pain on pressure less acute and more marked in certain directions than in others. Looseness quite marked. Pain from tapping not great. Pain not markedly increased with time, but a feeling of apprehension induced; inflammatory symptoms not marked, and no swelling. Occurs in connection with teeth having living pulp as frequently as with roots having devitalized pulp. No recognized cause.

Pericemental abscess occurs usually in anemics. Prognosis always unfavorable. Have never been able to afford permanent or positive relief. Remedy, extraction.—*Dental Cosmos, July, 1897.*

CARBOLIC ACID TEMPERS STEEL TOOLS, according to the *Engineer*, which quoted from a French source. M. Levat, who recommends its use for this purpose, tempered one cold chisel in water, and another in a solution of carbolic acid, after both had been heated to a cherry red. The chisels were then set to work on extra hard wrought iron, and it was found that the one tempered in water became notched after a short time, whilst the one tempered in carbolic acid remained perfectly intact. A second test was made with two puddled steel bars, which were heated to white heat and tempered in water and carbolic acid respectively. The bar tempered in carbolic acid showed a much finer fracture, which reflected like a mirror when filed, and its carbon contents were not increased, but in the bending test it showed more elasticity and pliability than the other, while its hardness made it more suitable for tools.

X-RAYS AND FOREIGN BODIES IN THE AIR PASSAGES.—At a meeting of the Paris Academy of Medicine, M. Berger showed a skiagraph of a pin present in the pharynx just above the hyoid bone of a child two years old. By aid of this means the pin was readily removed. In a case at the Nottingham Children's Hospital, a child was said to have swallowed a piece of slate pencil and had every symptom of a foreign body in the air passage. The X-rays discovered nothing, but eventually nearly a month later, during a violent attack of coughing, a piece of slate pencil three-quarters of an inch long was ejected. The remarks of most interest in the case by Dr. Marshall are, firstly, that slate is found to transmit the rays and so could not be seen, but composition slate pencil is well defined. The second point is that he disagrees with authorities, such as Gray and Erichsen, who state that the right bronchus is the one in which foreign bodies usually lodge. All the cases he has seen have been in connection with the left. He therefore thinks that the passage into the left bronchus is easier than is generally supposed, and that the statement usually made requires correction.—*Brit. Jour. Dent. Sc.*

Letters.**EIGHTEEN OUT OF FORTY-FOUR PASS.**

CALIFORNIA, August 10, 1897.

To the Editor of the Digest,

DEAR DOCTOR:—I send you this clipping from a daily paper, thinking it would be of sufficient interest for publication; also to let you know that the California Board does not pass everyone who applies for examination.

The annual session of the State Board of Dental Examiners closed yesterday at San Francisco. Out of the 44 applicants only 18 passed successfully.

The membership of the board for the next year is as follows: President, Dr. F. W. Bliss, Santa Cruz; Secretary, Dr. W. A. Moore, Benicia; Drs. F. H. Metcalf and F. F. Tebbets, of Sacramento; Drs. Thos. Morffew, Ducker, and Backman, of San Francisco.

Respectfully,

A MEMBER.

PHILADELPHIA LETTER.

PHILADELPHIA, August 13, 1897.

To the Editor of the Digest,

DEAR EDITOR:—For many years Pennsylvania has been known for its political caucuses, and during late years the name of Quay is somewhat mixed up in them. It would be a surprise if small or individual organizations should not follow the general customs of the state. For five months with untiring energy the leaders worked to complete their caucus in the Pennsylvania State Dental Society, and so perfect was it that Quay with all his power never had anything with which it could be compared.

We hear much praise about our new dental law, but practically it is very defective. American dentistry derived its reputation from its mechanical skill and manipulative ability, but this law goes to the other extreme. Look at the qualifications—General Anatomy, Physiology, Special Dental Anatomy, Dental Physiology, Chemistry, Dental Histology, Metallurgy, Materia Medica, Anesthesia, Oral Surgery, Therapeutics, Bacteriology, Dental Pathology, Principles and Practice of Operative and Prosthetic Dentistry. But a certificate from the demonstrator of the college from which a student graduates will be accepted as evidence of his manipulative ability.

Then look at the loop-hole. Anyone from any part of the United States, be he artisan, carpenter, blacksmith or cobbler, may live in Pennsylvania from September first to October first and commence practicing dentistry, and by this new law he is legally qualified as a dentist for the rest of his days.

I understand that the union of the Southern and the American went through without apparent opposition. Doctor Rich, who was temporary chairman, demonstrated what a positive character he is, to the amusement of many members.

QUAKER.

NEW YORK LETTER.

NEW YORK, August 20, 1897.

To the Editor of the Digest,

MR. EDITOR:—Another of the faithful ones has dropped out of the lines—Dr. W. S. Elliott, well and favorably known in the vicinity of Greater New York. Thirty-five years ago he left Sag Harbor, the field of his first practice, and settled in Goshen, and became an active participant in the enthusiastic society movements of those days. Dr. Elliott had a good quality of brain and more than ordinary good purpose of heart, and he at once put his hand to the oar. His writings are quite above the mass of the literary products of our journals and we have always prized his conversations highly during these many years. In inventive genius he has left a good record. Among the first was the "Elliott Suspension Engine." All his work has the stamp of faithful workmanship, particularly his office practice. His life has shown no little of the world's so-called hardships, but he stood diligently at his post. For the last two years he occupied his first field of practice, Sag Harbor. His works will remain to remind us of his industry and contribution to the general fund of professional acquisition.

We take this from the *New York Herald*, not bad as the forerunner of a case for damages, possibly a question of jurisprudence:

SWALLOWED TOOTH FILLING.—Middletown, N. Y., July 28, 1897.—Charles Shepard, of New York, who has been boarding at a farm-house near Otisville, is dangerously ill as a result of swallowing a gold tooth filling, and was to-day removed to New York on a cot. While laughing a few days ago Mr. Shepard felt the filling drop from one of his teeth. He made an effort to secure it, but it disappeared down his throat. "That will cause me serious trouble, I fear," said Mr. Shepard to a friend, who advised him to think no more about it. A few days after Mr. Shepard was taken seriously ill with appendicitis and is now in a critical condition.

Who's responsible? Some of our many dentists who have suffered with appendicitis should condole with this unfortunate.

Isn't it about time to call a halt when a lady has half the hair taken off her head and her face and neck burnt to a blister by X rays? New York has a decided excitement on her hands over an effort to diagnose an obscure case of dental pain, with the results as above detailed. We give it as our private opinion that brains is a safer commodity in dental practice than so much hurried experiment with electricity. The non-ability among the mass of practitioners to diagnose dental difficulties is something sad to contemplate. Well, the case in point indicates a suit for damages, and then look out for "expert" ability. Very commonplace men are coming to the front in these days when journals can be used partially or practically to bolster up assumptions instead of good judgment and a fair amount of actual knowledge. These things are being emphasized among thinking men and we think moral character should play an important part in the qualifications of a practitioner. New York has a law on her statute books for regulating these things, but there is truth in the saying that "water will not rise above its head."

Chicago this time—\$2,900 for treating pyorrhea. Who says there is no money in dentistry—excuse us, this comes under the new head of "Stomatology." We are told that new revelations are coming by the way of Moscow regarding the cause of this mysterious malady. Well, who will fiddle while that paper is being read in Moscow? We think it will be Bonwill, for he declares that the cause is "improper occlusion," or mal-occlusion. Gentlemen, no one of you will ever be able to place the cause (scientifically), it is beyond the findings of the finite mind. No, not even the younger generation. Nothing but some of the phases of truth can be demonstrated.

Surely Moscow is safe, for some of the older men will be in council there and these younger men will not have a free field. Talbot and Bonwill guard our honors on this question; the first is "hot water, sure cure"; then, "sulfuric acid," and then, yes, and then. In the meantime there is a large practical dealing on the lines of medical help. It is now the most talked of subject, with but very little light, and the most neglected of anything in the line of intelligent practice. We see vivid evidences of this constantly. Let men demonstrate more and talk less, and one can see better which way

the wind is blowing, for there is much blowing. When men are so far off, claiming to be scientific, and become antagonistic for the sole purpose of gratifying a selfish pique against a sister society, then so-called science falls into muddy places, the proud distinction trails in the mud, and associated bodies fall into uselessness.

New York has another episode in dental practice. A patient becomes insane in the public streets from the use of cocaine after the extraction of teeth. We overheard a conversation regarding the use of this drug between two practitioners, one well known and of large experience. The younger one said, "I do not find any difficulty, used in my way." The older one replied, "I felt so till I had a case lying in my chair for over three hours and then it went into the hands of a physician. The consequence was, I had to deduct \$70 from my bill to meet the charge of the physician. I don't use cocaine now; I use carbolic acid, one per cent, and am successful and have no trouble."

The White Mountain convention was a success. It had more than a few; there were just fifteen present, so all of them got into office. The parlor car attachment and the banquet had no friction—nothing like success. It is an item of interest, but all did not get a prize. On the whole there is no fault to be found; they paid their own bills.

Dr. LeRoy is attending all the summer gatherings. He travels on his own schedule time, for he uses his wheel. He goes from Old Point Comfort to the battle fields of Virginia, on to Gettysburg, and so on home.

We have read "The Open Letter" in the *Cosmos*. Well, it proves only this, that politics have their price in all parties that depart from the true object of association. We do not expect to see any change for the better unless the real object of dental societies is given the prominence—that scientific and fraternal attainments only are sought. Will this become the central purpose? Now's the opportunity, as we have a national association of dentists. How much better this sounds—an association that covers the ground. This offers a rare chance for Dr. Fillebrown, the president, and he strongly favors the National Museum at Washington. Somehow we are impressed that quicker blood is going to flow and better results will follow. Our best wishes will go with Dr. Fillebrown and the new body. Omaha is a good place to start

off, for if we are not much mistaken there will be an infusion from the northwest and southwest. New members will bring new energy, the northwest is full of it, and there may be a delegation from the Klondike by next autumn, for we hear that the gold fever is taking hold of some of our dentists. "Go to Klondike, young man," so would say Horace Greeley.

We learn that the late Prof. Abbott's place is to be filled by Dr. Starr, the present president of the First District Society. His appointment is very generally thought a good one.

It seems a pity that in these days of needed advance there could not be someone brought under a strong conviction and then have the courage of his convictions to help put them into force. One much-needed reform is to bring about a radical change in the method of teaching, particularly in the operative department. What Dr. Atkinson advocated and carried out as far as he could, that "there was no power in anything but demonstrated and conversational teaching over the patient;" and we are fully convinced that it is absolutely true, just as true as it is that all the preaching in the pulpit carries no conviction unless the one there knows the truth of what he says and can give testimony. How true it is that "words are cheap." The infirmary practice shows too sadly the deficiency of the kind of teaching we have mentioned, and there are too vivid indications of this great need shown by what is given as intellectual weakness by the Jersey examinations, as noted in the August *Items of Interest*. There is a great gap somewhere; will it be filled?

Cordially, NEW YORK.

A HARD DRILL can be made by heating to a cherry red and cooling in mercury.

TO TAKE AWAY ODOR OF IODOFORM.—All persons using iodoform know how difficult it is to remove its odor from the hands or from instruments. Use spirits of turpentine on the hands or instruments; it can be added to water, and in using soap makes it very efficacious.—*Le Progres Medicale*.

REMOVAL OF THE MYELOID SARCOMA WITHOUT SACRIFICE OF BONE.—Mr. C. Symonds showed a boy, aged 15, from whose lower jaw he had removed a central myeloid sarcoma on Jan. 20, 1896. The tumor had destroyed a large portion of the jaw, only a bridge of bone being left on either side of the middle line. The tumor passed back under the tongue and was removed by erosion without sacrifice of bone, leaving the lower border of the jaw, as well as a bridge of bone along the alveolar process. There had been no recurrence and the patient has now a firm, bony jaw.—*Brit. Jour. Dent. Sc.*

The Dental Digest.

PUBLISHED THE

TWENTY-EIGHTH DAY OF EVERY MONTH.

Editorial.

AN ENCOURAGING OUTLOOK.

The recent meetings at Old Point Comfort were of more than usual interest. Despite the fact that the American and Southern Associations had separate programs and held separate meetings at the same hours, each had good meetings and a fair attendance. Notwithstanding that much time and interest, which would otherwise have been devoted to literary work, were consumed by the formation of the National Association, the published proceedings will show a great improvement over previous years. And when we all meet together next year at Omaha, with the sections well organized for work, what may we not expect?

REPLY TO DR. CASSIDY.

On page 451 of the current issue will be found an admirable address by Dr. J. P. Cassidy. In it he challenges a statement which we made, that "there was not a single dentist in this country who could make an accurate quantitative analysis of any dental amalgam," and says that hundreds could do so, if it were necessary.

Perhaps we put it too strongly, so we will modify it and say that very few can do so. We will, however, make another proposition, which is much more important from a practical standpoint, that the dental profession do not know how to select the most desirable alloy from the great variety offered them. Furthermore, we are prepared to prove that many of the most skillful operators are using the very poorest makes of amalgam. We do not care to discuss this question just now, however, but will reserve it for our next issue, when the report of Section III of the American Association will appear.

LAST MEETING OF THE AMERICAN.

The last meeting of the American Dental Association was held August 6, at Old Point Comfort. This closed an organization which has been an important factor in the profession for over 30 years. It has had a great career, and those who have taken an active part in

its work may well be proud of what has been accomplished. At times it seemed as if not much good were being done, but take a careful survey of its work and influence from the beginning, and who can estimate its power for good?

Although we were active in reorganizing the two bodies into the new association, and feel much encouraged at the outlook, yet when the last session of the good old society came it was sadder than we had expected, and this feeling was shared by all who had been workers in it. There were but two of the original members present, but there were several who had been constant attendants for from 20 to 30 years, and the "experience meeting," which was the last, brought forth unusual feeling and showed that the memories of the American Dental Association will die only with those who composed it.

SPECULATING IN FUTURES.

Rumors are afloat that the National Association of Dental Faculties at their recent meeting adopted rules which lower the standard of requirements for students entering the various dental colleges. Last year it passed rules to go into effect in the fall of 1897, requiring an adequate amount of education of those who were received into the colleges of the association. This was based on an ascending scale, so that each year the requirements were made greater. Commendation and praise were heard on all sides because of this action, and rightly.

An examination of the proceedings of the Faculties' Association for this year would seem to indicate, however, that all these reforms and higher standard of requirements existed only on paper. We can judge only from their proceedings, which are published in this issue, but if the following resolution is not a step backward we are much mistaken:

The rule regarding preliminary qualifications adopted in 1896 was declared to have been adopted in an unconstitutional manner, and was therefore rescinded. The following was adopted in its place, and by unanimous consent was ordered to go into effect at once.

Resolved, That the minimum preliminary education requirement of a college of this association shall be a certificate of entrance to the first year of a high school, or—in states that have no high school—of graduation from a grammar school, or its equivalent, to be determined by an examination.

Resolved, That nothing in the above shall be construed to interfere with colleges of this association that are able to maintain a higher standard of preliminary education.

If the Faculties' Association can pass resolutions and rules of requirements one year to take effect the next, and at the next session can rescind the former action, we think it will be wise in future to withhold the praise until the reforms go into effect.

We give the following from the proceedings of last year:

Mr. Melville Dewey, secretary of the Board of Regents of the University of New York, appeared before the association by invitation of some of the members, and gave a masterly address on the needs of the movement for higher education in professional ranks. Incidentally, Mr. Dewey explained some of the details of the system pursued in New York, and stated that, greatly to the surprise of those in charge of the various professional educational institutions in the state, the number of students had steadily increased since the higher requirements had been put into force by the Board of Regents.

While reading this, without being able to hear the masterly address, the question naturally arises—was it the masterly part of the address, or the information that raising the standard increased the number of students, which influenced the Faculties' Association to adopt the higher rules for 1897?

Speculating in futures would seem to be as uncertain in college faculty associations as in other lines. There is this important difference, however. The Faculties' Association can do so without being called upon for margins to cover losses which often occur when dealing with staple commodities. It can therefore speculate in futures without much danger of suffering financial loss.

A UNITED FRONT.

The consolidation of the American and Southern Dental Associations into the National Dental Association is an accomplished fact. For years there has been a desire on the part of many in both organizations to have this brought about, but not until this year did it seem best to take the steps necessary for union. The sentiment at the recent meetings was so unanimously in favor of the action taken that surely we can now present a united front.

The constitution and by-laws prepared by the two committees were adopted almost without change, although some features were not what all desired. Yet so strong was the desire for union, that individual objections and wishes were wisely withheld, and the new organization was at once completed.

Heretofore when our profession has been thought of in society work it has always presented itself in two parts, but this division is now gone. The next step is for us all to work our hardest and get

a much larger per cent of the profession into the societies. At present not more than one-fourth of the practicing dentists belong to any dental organization. Think of over three-fourths of this great profession going it alone and not getting the great benefit of associated effort, such as our dental societies offer. We must be in earnest about remedying this defect, and all society members should do their part.

Notices.

BI-STATE DENTAL MEETING.

The bi-state dental meeting of the Southwestern Michigan and Northern Indiana Dental Societies will be held at Benton Harbor, Mich., Sept. 14-15, 1897. A cordial invitation is extended to the profession in these and other states to attend.

F. H. ESSIG, Secretary.

MINNESOTA STATE DENTAL ASSOCIATION.

The fourteenth annual meeting of this association will be held at Minneapolis, September 8-10, 1897, in the dental department building of the State University. An interesting program is being prepared and a good meeting is assured. A cordial invitation is extended to all dentists outside of the state and those in the state are urged to come and join with us. Reduced rates will be given, as the State Fair will be held during that week.

H. L. CRITTENDEN, Secretary.

FIRST DISTRICT DENTAL SOCIETY OF ILLINOIS.

This society will hold its 15th annual meeting at Streator, Ill., Sept. 14-15, 1897. An invitation is extended to not only the members of the society, but to all dentists in this state or elsewhere who may desire to enjoy the program arranged for this occasion. A splendid program of clinics and essays has been arranged, and with the discussions that may follow will make a treat too rare to be missed by any live dentist. So come one and all. If you have a bright idea or a new method or appliance, bring it along and do us good. If you do not know anything new, come just the same and we will do you good.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

At the annual session of the above association, held at Old Point Comfort, Va., July 30-August 2, 1897, with 22 states present, the following officers were elected for the new year: President, Dr. C. G. Edwards, Louisville, Ky.; Vice-President, Dr. G. L. Parmele, Hartford, Conn.; Secretary and Treasurer, Dr. Chas. A. Meeker, Newark, N. J. The president appointed as members of the Committee on Colleges, Dr. G. Carleton Brown, Chairman, Elizabeth, N. J.; Dr. H. H. Johnson, Macon, Ga.; Dr. M. H. Chappell, Knightstown, Ind. Dr. L. Ashley Faught, 1415 Walnut street, Philadelphia, was appointed Secretary by the Committee.

SOUTHERN DENTAL ASSOCIATION, BRANCH OF THE NATIONAL DENTAL ASSOCIATION.

The following officers were elected for the ensuing year:—President, Dr. E. P. Beadles, Danville, Va.; First Vice Pres., Dr. W. E. Walker, Pass Christian, Miss.; Second Vice Pres., Dr. T. P. Hinman, Atlanta, Ga.; Third Vice Pres., Dr. F. P. Welch, Pensacola, Fla.; Treasurer, Dr. D. B. Brabson, Knoxville, Tenn.; Cor. Secy., Dr. C. L. Alexander, Charlotte, N. C.; Rec. Secy., Dr. S. W. Foster, Atlanta, Ga. Executive Committee, Dr. N. E. Turner, Raleigh, N. C.; Dr. S. B. Cook, Chattanooga, Tenn.; Dr. W. T. Arrington, Memphis, Tenn.; Dr. R. K. Luckie, Holly Springs, Miss.; Dr. W. R. Clifton, Waco, Texas; Dr. H. E. Beach, Clarksville, Tenn. The next meeting will be held at St. Augustine, Fla.

THE NATIONAL DENTAL ASSOCIATION.

Following are the officers of the new organization:—President, Dr. Thos. Fillebrown, Boston; Vice Pres. from the East, Dr. James McManus, Hartford, Conn.; Vice Pres. from the West, Dr. L. L. Dunbar, San Francisco; Vice Pres. from the South, Dr. B. Holly Smith, Baltimore; Rec. Secy., Dr. Geo. H. Cushing, Chicago; Asst. Rec. Secy., Dr. W. E. Walker, Pass Christian, Miss.; Cor. Secy., Dr. Emma Eames Chase, St. Louis; Treasurer, Dr. Henry N. Morgan, Nashville, Tenn. Executive Committee, for three years, Dr. J. N. Crouse, Chairman, Chicago; Dr. V. H. Jackson, New York City; Dr. L. G. Noel, Nashville, Tenn. For two years, Dr. M. F. Finley, Washington, D. C.; Dr. J. D. Patterson, Kansas City; Dr. H. A. Smith, Cincinnati. For one year, Dr. Geo. Eubank, Birmingham, Ala.; Dr. W. P. Dickinson, Minneapolis; Dr. C. N. Peirce, Philadelphia. The next meeting will be held at Omaha, Neb.

LATEST DENTAL PATENTS.

- 586,727. Dental Instrument, John W. Hard, Tacoma, Wash.
- 587,775. Clamp, Frank J. Yockel, Allegheny, Pa.
- 587,058. Rubber-Dam Clamp, Samuel E. Knowles, Alameda, Cal.
- 587,223. Head-Rest, Stewart D. McKelvey, assignor to F. E. Case, Canton, Ohio.
- 587,224. Head-Rest Pad, Stewart D. McKelvey, assignor to F. E. Case, Canton, Ohio.
- 588,092. Depurator, Karl L. Sandrowski, Berlin, Germany.

TRADE-MARKS.

- 30,437. Toilet Preparations, including Soap, Dentifrice, and Hair Restoratives, Roger & Gallet, Paris, France.
- 30,438. Same as 30,437.

(List furnished by John A. Saul, Patent Attorney, Washington, D.C.)

OLDEST PRACTITIONERS.—The two oldest living dentists now in practice in the United States were present at the Old Point Comfort meetings—Dr. W. W. H. Thackston, of Farmville, Va., and Dr. John B. Rich, of New York City. The latter commenced practice in New York in 1836.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

The fourteenth annual meeting of the National Association of Dental Faculties was held at the Hygeia Hotel, Old Point Comfort, Va., commencing Friday, July 30, 1897.

The following members of the association were represented as noted below:

Alabama Dental College, Birmingham, Ala.—T. M. Allen.
 University of California, Dental Department, S. F., Cal.—L. L. Dunbar.
 Columbian University, Dental Dept., Washington, D. C.—J. Hall Lewis.
 Howard University, Dental Department, Washington, D. C.—A. J. Brown.
 National University, Dental Dept., Washington, D. C.—J. Roland Walton.
 Atlanta Dental College, Atlanta, Ga.—William Crenshaw.
 Dental Dept. of Southern Medical College, Atlanta, Ga.—S. W. Foster.
 Chicago College of Dental Surgery, Chicago—T. W. Brophy, L. Ottowy.
 Northwestern University Dental School, Chicago—Theo. Menges.
 State University of Iowa, Dental Dept., Iowa City, Iowa.—W. S. Hosford.
 Louisville College of Dentistry, Louisville, Ky.—H. B. Tileston.
 Baltimore College of Dental Surgery, Baltimore, Md.—M. W. Foster.
 University of Maryland, Dental Dept., Baltimore, Md.—F. J. S. Gorgas.
 Boston Dental College, Boston, Mass.—J. A. Follett.
 Harvard University, Dental Department—Thomas Fillebrown.
 Dental College of the University of Michigan, Ann Arbor, Mich.—J. Taft.
 University of Minn., Dental Dept., Minneapolis, Minn.—W. P. Dickinson.
 Kansas City Dental College, Kansas City, Mo.—J. D. Patterson.
 Western Dental College, Kansas City, Mo.—D. J. McMillen.
 Marion-Sims College of Medicine, Dental Dept., St. L., Mo.—J. H. Kennerly.
 Missouri Dental College, St. Louis, Mo.—A. H. Fuller.
 University of Buffalo, Dental Department, Buffalo, N. Y.—W. C. Barrett.
 New York College of Dentistry, New York City—F. D. Weisse, J. B. Littig.
 Cincinnati College of Dental Surgery, Cincinnati, O.—G. S. Junkermann.
 Ohio College of Dental Surgery, Cincinnati, Ohio—H. A. Smith.
 Western Reserve University, Dental Dept., Cleveland, O.—Geo. H. Wilson.
 Pennsylvania College of Dental Surgery, Philadelphia, Pa.—C. N. Peirce.
 Philadelphia Dental College, Phila., Pa.—S. H. Guilford, Leo Greenbaum.
 University of Pennsylvania, Dental Dept., Philadelphia, Pa.—Jas. Truman.
 Tennessee Medical College, Dental Dept., Knoxville, Tenn.—R. N. Kesterson.
 Central Tennessee College, Meharry Medical Department, School of Dentistry, Nashville, Tenn.—G. W. Hubbard.

University of Tenn. Dental Dept., Nashville, Tenn.—J. P. Gray, L. G. Noel.
 Vanderbilt University, Dental Dept., Nashville, Tenn.—H. W. Morgan.
 University College of Medicine, Dental Dept., Richmond, Va.—L. M. Cowardin.
 Royal College of Dental Surgeons, Toronto, Canada—W. E. Willmott.

The following schools were elected to membership:
 Milwaukee Medical College, Dental Department, Milwaukee, Wis., represented by Reinhold E. Maercklein.

Tacoma Dental College, Tacoma, Wash., the constitution being signed by proxy by Dr. Kennerly.

New York Dental School, New York City, represented by John I. Hart.
 Ohio Medical University, Dental Dept., Columbus, O., rep. by J. F. Baldwin.
 Baltimore Medical College, Dental Department, Baltimore, Md., represented by J. W. Smith and William A. Montell.

The application for membership of the University of Omaha, Dental Department, was laid over till next year, at the request of its officers.

Applications for membership were reported by the Executive Committee from the Pittsburg Dental College, Pittsburg, Pa.; Dental Department of the College of Physicians and Surgeons, San Francisco, Cal.; Colorado School of Dentistry, Denver, Col.

The following report laid over from last year was adopted:

"Your committee on choosing a color respectfully report that they have decided to recommend the standard lilac as the distinctive dental color, and they recommend the adoption of the academic costume according to the requirements observed by the intercollegiate system."

The resolutions laid over from last year, making the annual college term seven full months, and recommending that the annual meetings be held in connection with the National School of Dental Technics, and at a time of the year when the colleges are in session, were negatived.

A committee, consisting of Drs. Henry W. Morgan, M. W. Foster, Theo. Menges, C. N. Peirce and H. A. Smith, was appointed to meet a similar committee from the National Association of Dental Examiners, for the purpose of harmonizing the differences of opinion between the two associations. This committee reported rules which had been agreed upon by the two committees.

The report was discussed at length and again referred to the committee, which later reported, through the Executive Committee, a resolution, which was adopted, providing for the codifying and arranging of the existing rules of the association, and the preparation of such additional rules as may be deemed advantageous to both organizations in advancing the standard of dental education in the United States. On motion, the committee which had had the matter in charge in the conference was continued for this purpose.

A communication from the Dental Department of the State University of Iowa was received, asking consent of the association to its conferring the honorary degree on Dr. F. P. Weber, of Cherokee, Iowa. The request was declined on the ground that it is contrary to the practice of the association.

A similar communication from the University College of Medicine, Dental Department, Richmond, Va., asking the privilege of conferring the *ad eundem* degree on Dr. Thomas G. Cowardin, of London, Eng., was refused upon the same grounds.

The rule regarding preliminary qualifications adopted in 1890 was declared to have been adopted in an unconstitutional manner, and was therefore rescinded. The following was adopted in its place, and by unanimous consent was ordered to go into effect at once:

Resolved, That the minimum preliminary education requirement of a college of this association shall be a certificate of entrance to the first year of a high school or—in states that have no high school—of graduation from a grammar school, or its equivalent, to be determined by an examination.

Resolved, That nothing in the above shall be construed to interfere with colleges of this association that are able to maintain a higher standard of preliminary education.

A communication was read from Dr. W. Mitchell, president of the American Dental Club of London, requesting the appointment of a committee to cooperate with a similar committee in Europe for the purpose of securing just recognition of the diplomas issued by the colleges belonging to the association. The communication was favorably considered, and the president appointed as the committee Drs. W. C. Barrett, D. J. McMillen, S. H. Guilford, A. H. Fuller and Faneuil D. Weisse.

The Ad Interim Committee reported that one new question decided by them during the year was that a student who was in arrears for fees could not be accepted by another college if objection was made by the college to which he was indebted. This ruling was sustained by vote of the association.

The committee also recommended that steps be taken to secure definite knowledge as to the curricula and requirements of foreign colleges, so that the members of the association should be able to decide upon the standing of students coming from them. Referred to the committee appointed to consider the matter of Dr. Mitchell's letter.

A paper prepared by Dr. W. C. Barrett, Buffalo, N.Y., at the request of the Executive Committee, and entitled "The Study of Anatomy," was read by its author.

The paper was, on motion, directed to be incorporated in the official report and copies sent to the journals for publication.

A committee, consisting of Drs. S. H. Guilford, Theo. Menges and M. W. Foster, was appointed to select persons to prepare papers on subjects connected with the work of the association, to be read before the next meeting.

Dr. Barrett offered the following, which was adopted:

Resolved, That the final vote upon the admission of a college to this association shall not hereafter be taken unless a duly certified and qualified delegate is in attendance.

The following resolution, offered by Dr. L. L. Dunbar, was adopted:

Resolved, That in order to maintain a reputable standing in this association no college under its jurisdiction shall permit any member of its faculty or teaching staff, board of trustees, or stockholders to serve in a judicial capacity as a member of a state board of examiners.

Dr. Taft offered the following, which was adopted:

Resolved, That a committee of three on curriculum be appointed, whose duty it shall be to compare the schemes of study of the various dental colleges, with the view of harmonizing these schemes and making them as nearly alike as practicable, to report next year.

The Committee on Text-Books recommended the following: Essig's "American Text-Book of Prosthetic Dentistry," Hodgen's "Dental Metallurgy," Schafer's "Essentials of Histology" (fourth edition), Abbott's "Principles of Bacteriology" (third edition), Gray's "Anatomy" (last edition), Luff's "Manual of Chemistry," Burchard's "Compend of Dental Pathology and Therapeutics."

The report was adopted, and the committee was instructed to examine Kirk's "American Text-Book of Operative Dentistry," and Marshall's "Injuries and Surgical Diseases of the Face, Mouth and Jaws," and forward their views at the earliest possible moment to the secretary, in order that they may be incorporated in the printed Transactions.

A committee, consisting of Drs. M. W. Foster, William Crenshaw and L. G. Noel, reported appreciative resolutions on the death of Drs. Frank Abbott and Francis Peabody, late members, who have died since the last meeting was held. The resolutions were adopted.

The following lie over for final action till next year:

Offered by Dr. H. W. Morgan, seconded by Dr. H. B. Tileston:

Resolved, That on and after the session of 1899-1900, the regular sessions of each college belonging to this association shall be extended to four years.

Dr. J. Taft moved to amend the constitution to require applications for membership to be sent to the secretary of the Executive Committee instead of to the secretary of the association.

Offered by Dr. T. Fillebrown:

Resolved, That no college connected with this association shall confer any degree as honorary which is usually granted in due course of study and examination. All former rules on the subject are hereby repealed.

Offered by Dr. Barrett:

Resolved, That after the regular session of 1898-9 the annual college term for the members of the association shall be seven full months.

Dr. Crenshaw moved to strike out Rule 8 and adopt the following instead:

Resolved, That the time in which students can enter schools of this association shall be the first ten days of the session of the school, dating from the time announced in its catalogue.

The following were elected officers for the ensuing year: T. W. Brophy, Chicago, President; D. J. McMilan, Kansas City, Mo., Vice-President; J. H. Kennerly, St. Louis, Mo., Secretary; H. W. Morgan, Nashville, Tenn., Treasurer. J. Taft, Cincinnati; Thomas Fillebrown, Boston, Mass.; B. Holly Smith, Baltimore, Md., Executive Committee. James Truman, Philadelphia; F. J. S. Gorgas, Baltimore; J. Hall Lewis, Washington, D. C., Ad Interim Committee.

The newly elected president, on being installed, announced the following appointments: J. A. Follet, Boston, Mass.; H. A. Smith, Cincinnati, Ohio; L. L. Dunbar, San Francisco, Cal.; J. D. Patterson, Kansas City, Mo.; W. T. McLean, Cincinnati, Ohio, Committee on Schools. S. H. Guilford, Philadelphia, Pa.; William Crenshaw, Atlanta, Ga.; W. C. Barrett, Buffalo,

different boards of dental examiners of the several states and territories and of the District of Columbia as may elect to join it." Now the question comes up at once whether they had elected to join. By intimation they did, when they appointed the committee of this body to get this charter. I do not know whether that would stand legally; they certainly gave us the authority and intimated that that was what they wanted done, and that far elected to join.

The President: Now let me interrupt. Would it not be necessary, or would it be necessary for this body to now sanction what has been done? Would not that be right?

Dr. Noble: Precisely. I supposed that this report of the committee needs the sanction of this body. We acted just as far as we thought we had any authority. And here is something that would come in right here:

"October 20th, 1896.—A meeting of the incorporators of the National Board of Dental Examiners, held this day at the National University rooms, elected to its membership all state boards of dental examiners having membership in the National Board of Dental Examiners, and adopted the constitution and by-laws of said National Board of Dental Examiners. On motion of Dr. M. F. Findley, Dr. J. T. Abbott, of Manchester, Iowa, was elected president; Dr. H. S. Noble, of Washington, D. C., vice-president, and Dr. Charles A. Meeker, of Newark, N. J., secretary and treasurer for the year ending August 5, 1897."

Dr. Meeker: In furtherance of that, here is a paper which I think would make the association legal throughout the United States. These proceedings were incorporated in our printed proceedings, which were sent throughout the country, and the various state boards have all subscribed to it. I can read off the states that have subscribed to this act of incorporation. This was done by legal advice, and in order to make it legal I sent this throughout the country, and I have here the states, signed by the president and the secretary of the board, and the names of the board of examiners who subscribed in the capacity of their boards to these articles of incorporation: Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, District of Columbia, Georgia, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Nebraska, New Jersey, New Hampshire, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Utah, Vermont, Washington state, West Virginia. There were five districts there; one of the districts has signed; also Wisconsin.

The only ones I remember that absolutely refused to sign were the states of New York and Illinois. I sent four different communications to Illinois, to Dr. Harlan, and I changed the address each time, to the secretary and members of the board, and they all sent them back, but without the signature of the president and the secretary. I hear that Illinois has a new board now and that Dr. Harlan is out. I had considerable correspondence with New York and they absolutely refused to sign; said they did not have anything to do with it, were not members of the board. Dr. Carr came down to Asbury Park and joined the association, with the consent of the board. At the Brooklyn meeting this year they had a controversy and one of the members of the board said that Dr. Carr was not authorized to sign; that he did it on his own responsibility; that they were not members and could not be members on account of their dental law. But the majority of the states are members of our association.

Dr. Meeker: I have the following communication from California:

California State Board of Dental Examiners, Secretary's Office, Benicia.
Dr. C. A. Meeker, Secretary National Board of Dental Examiners:

Below you will find a resolution adopted at a meeting of the California State Board of Dental Examiners held Saturday, May 8, 1897.

Respectfully yours, W. A. MOORE, Secretary.

N. Y.; W. P. Dickinson, Minneapolis, Minn.; Faneuil D. Weisse, New York City, Committee on Text-books. J. Taft, Cincinnati, Ohio; Edward C. Kirk, Philadelphia, Pa.; A. H. Fuller, St. Louis, Mo., committee to select subjects and essayists for next meeting.

Adjourned to meet at the call of the Executive Committee.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

The fourteenth annual session of this organization was called to order at 10:30 a. m., Friday, July 30, 1897, at Old Point Comfort, Va. President Abbott called the meeting to order. The secretary called the roll.

The following committee on credentials was then appointed: Drs. Moore, Parmele and Noble.

The committee on incorporation presented the following report:

Board of Dental Examiners for the District of Columbia.
Washington, D. C., July, 1897.

National Board of Dental Examiners:

Your committee appointed to secure the incorporation of the National Association of Dental Examiners respectfully report that after legal consultation and advice an act of incorporation was prepared and filed; a copy of which is herewith submitted.

It was found that no one but a legal resident of the District of Columbia could file a charter, so Dr. Wms. Donnally's name was substituted by authority of the officers of the association instead of that of the full committee.

This association and the incorporators have been severely criticized for this act as of supposed aggression or interference with the prerogatives of the National Association of Faculties and of state boards.

Your committee disclaim any wish or thought of interference or control of the acts of any state board; the charter neither gives nor confers power over any state board or institution.

The charter is for protection, not aggression, so that this association may have a legal status.

The charter is a copy of the constitution under which the association has worked for years, and has received the approval of prominent men of the profession for the past ten or a dozen years.

Most of the adverse criticism of the objects of the charter has come from ignorance and prejudice which a full understanding of the case will be likely to dispel.

H. B. NOBLE, Chairman.

Dr. Donnally: I suggest a slight amendment. Whatever was done, although it was done by the use of one name, was done by the authority of this association, and not by the volunteer action of this committee. After the substitution of one name is spoken of I would suggest that there be added "by and with the consent of the officers," or "by the authority of the officers of the association."

The President: Either way would be right and the suggestion is a good one. I was ready to sanction anything the committee did in the matter as satisfactory. They understood their business, and knew what the association required and what they intended to do.

Mr. Donnally: After the committee was appointed the question was raised whether a non-resident could take a charter, or his name could appear in it; it was discussed, and it was said that this committee should go ahead and do what was proper.

The President: Can an individual, not a resident of the state, join with any other individual and incorporate any body legally?

Dr. Noble: They can, if they take legal steps to join with them, and that is a question probably for this body. Dr. Faught will recollect on this very word "elect" or "elected," we had correspondence and the attorneys said that "elect" was placed there in our act of incorporation for a specific purpose. It says here, "This association consists of the undersigned and such

Dr. Noble: I think that the California State Board has a slight misunderstanding of the charter. That charter, as I stated in my report, does not give us any authority. They state in their communication that it is without authority of law, but I state most positively that we do have authority, now that we are chartered, and we would be recognized. When we got this charter I had it in my mind that some college, situated in some state, might have a grievance, and they might come to the officers here, and sue them personally for damages. I have been right in that situation myself. We reported to the commissioners of the District of Columbia that we did not think a certain college there was reputable and we would not accept its diplomas. The members of the board were each sued for \$50,000 damages, and we had to employ a lawyer and defend the case. I believe they say that this would not stand and has not proper authority. If there should be such a college in California, and it came to a suit, they would find that we did have a status in these United States; that is exactly what we do have. They misstate it when they say that we have no authority of law or status.

Dr. Donnally: I just want to say one word there. Some people have taken a notion, or it has been beaten into their heads by someone who is adverse to the interests of this association, that the incorporation of this body is an attempt to give it legal power over the state boards—an effort to create a power higher than the state boards. That is a misconception and altogether at variance with the truth of the matter. The whole thing might be simmered down to this, that we attempt nothing in the world but the exercise of a little influence by recommendations, and by every means we seek to reach an ideal, or to say what ought to be, by obtaining the wisdom and experience of the different boards, and, after counsel, deciding what is best and what ought to be the best method of doing the work of the different boards of the different states. But as to exercising control, we have never attempted that. We do not propose to go into the district of Columbia, or to California, or anywhere else, and say that we will ignore the plain letter of the law. We simply say what we think is the best way to accomplish the aim and objects of the best dental laws, and to do it through moral influence only. We do not claim any legal authority over state boards.

The President: Dr. Meeker, would it not be well to take a vote, so as to make ourselves an incorporated body? That matter was laid aside; would it not be well to take it up?

Dr. Meeker: Yes, I think so.

It was moved and seconded that the report of the committee on incorporation be adopted and confirmed. A vote was taken and the motion carried unanimously, and the committee discharged with the thanks of the association for the good work which they had done.

Dr. Adams: Mr. President, there are some gentlemen here constituting, I believe, a committee from the National Association of Dental Faculties, who would like to be heard.

The President: We would have no objection.

Dr. Henry Morgan, of the National Association of Dental Faculties: We have no desire to interrupt your meeting, but we have a communication we desire to present, and ask for immediate action upon the same.

Secretary Meeker read the said communication as follows:

Old Point Comfort, Va., July 21, 1897.

To the National Association of Dental Examiners.

Gentlemen:—At the regular meeting of the National Association of Dental Faculties, this day, the following resolution was unanimously adopted:

Whereas, at the request of the president of this association, the executive committee has considered the fact that differences of opinion exist between this association and the National Board of Dental Examiners, therefore be it

Resolved, That as the result of this consideration, the executive committee recommend the appointment of five members of this association as a

Whereas, the California State Board of Dental Examiners was created by the legislature of this state by statute entitled "An Act to insure the better education of practitioners of dental surgery and to regulate the practice of dentistry in the state of California," approved March 12, 1885, and

Whereas, the duties and powers of said Board of Dental Examiners are expressly and unequivocally defined by said statute, and

Whereas, said statute makes this board the sole judge of qualification of candidates for examination and license to practice in this state, and also to determine which dental colleges are reputable and to specify those which it considers to be disreputable and therefore cannot delegate such power to any other board or body in this state or other states, and

Whereas, this State Board of Dental Examiners is responsible for its acts to the people of the state of California only, and not to any other state or territory, and therefore cannot, by virtue of said statute, lawfully delegate or compromise its powers and duties to organizations outside of this state, neither does said statute authorize, permit or suggest any interference, affiliation, alliance, treaty or obligation with or to the management or decision of any other state or territorial board of dental examiners; neither does said statute counsel or recommend any like interference, alliance, treaty or obligation of other state and territorial boards in the management and decisions of said California State Board of Dental Examiners, and

Whereas, this State Board of Dental Examiners has hitherto affiliated with an association known as the National Board of Dental Examiners as a member thereof, and

Whereas, said National Board of Dental Examiners exists without authority of law and as such is unrecognized as an official body by this state or the United States, and

Whereas, such membership of the California State Board of Dental Examiners in the National Board of Dental Examiners has been called in question by the courts of this state to the great detriment of the California State Board of Dental Examiners, be it

Resolved. That after due counsel in the premises herein named it is the opinion of the California State Board of Dental Examiners that its connection with the National Board of Dental Examiners, as a member thereof, is unlawful and in excess of the powers conferred on said California State Board by said statute, and therefore this board hereby withdraws its membership from said National Board of Dental Examiners, together with all affiliations, alliance, treaty, compact and compromise of which such membership is expressed or implied by the rules and regulations of said National Board of Dental Examiners.

Resolved. That the secretary of this state board be directed to forward a copy of these resolutions and the reasons set forth for the same to the National Board of Dental Examiners.

Dr. Meeker: I would like to say that before I received this communication I was in receipt of a letter from the California State Board, stating that they wanted to come back into membership.

Dr. Chappell: I never could understand why our friends in California did this. Their laws are but very little different from ours and, as I understand, we meet for mutual counsel; we meet to have the representatives from different boards throughout the country talk with us. If that is the case, we have not the power to go to a state and inquire into whether any college has been properly organized. We leave that to the state boards who have the opportunity to inquire into the matter and report here. That is my understanding of the national board. As I say, our laws are similar to those of California, but in Indiana we are glad and proud to know that we are members of the national board. As we sometimes say, when a member of the church gets a little bit wrong, it is a very seasonable time to hold a prayer service with him. I think they will regret what they have done.

I believe in my mind that from this year on this association will be advanced and all the states will wish to be in.

Dr. Chappell: You remember in 1881-2 we had the same trouble.

Dr. Meeker: Yes; I believe they will want to come back.

Dr. Chappell: Then I think that communication ought to be referred to a committee. We wish to act conservatively; at the same time, when it is done, it should be done completely.

Dr. Thompson: As I understand this action of California it was not taken as a voluntary act of the examining board, but by direction of their supreme court. It seems that some gentleman came before them for the endorsement of his certificate or diploma, he being from an unrecognized college. In the meantime he graduated from some other institution that was not considered reputable, or recognized, and then went to a college that is on the recognized list, and they took him on a one year's course. In other words, they considered this unrecognized school as being equal to two years' instruction and gave him a diploma. The board examined him and refused to give him a certificate of qualifications, as I said, and they then refused to endorse this diploma without examination. The college being on the reputable list, action was brought in the lower court against them, and that court directed them to endorse the diploma. They appealed to the supreme court and the decision was there reversed, and the supreme court said the state board was the proper authority for stating what colleges should be recognized and reputable and what not, and advised them to withdraw from this association on that account.

Dr. Edwards: I think that every intelligent member of this association, and the members of the state boards, understand that the national association is purely an instructive body. Of course, as has been intimated before by the article read by the secretary, they cannot enforce any of their laws or rules in individual states. California and all other state boards recognize this association as the advisory and instructive board to give to the state board the qualifications of different colleges, and it is important for the boards to get that. It is through all the boards furnishing information to this body, as to the colleges in their districts, and I think there must be some politics in any state that would come to a decision that it was not advisable for their state board to join our association. I think we will all admit that this is purely an advisory and instructive board.

Dr. Meeker: I second Dr. Donnally's motion that it be laid on the table at present. There is no necessity of passing on it right away.

Dr. Donnally: I did not make that as a motion. I suggested the idea. But in order to bring things to a head I do make that motion, with the view of taking it up after a more complete organization. I think that before we get through with our work here we will be a more compact and better organized body, and will have our work systemized to such an extent that we will know where to put such a thing as that when it arises.

The president announced the following committee to confer with the committee of the National Association of Dental Faculties:

Dr. Wms. Donnally, Dr. G. E. Adams, Dr. George L. Parmele, Dr. C. G. Edwards and Dr. M. H. Chappell.

The President: As your chairman I have penned a few words as president. I do not claim it is a president's address, but a few words for your consideration. Shall I read them to you now, gentlemen?

Several voices: Yes, read them; read them.

Dr. Noble: Do you intend to send a copy of the action of this body to the National Association of Dental Faculties as to the appointment of our committee? They notified us officially.

The President: Perhaps it is hardly necessary; I told the chairman of the committee which I appointed to notify them when, where, etc.

committee of conference to meet a similar committee of the National Association of Dental Examiners to consider the mutual interests of the two associations, and that the board of examiners be informed of this action.

J. Taft, T. Fillebrown, B. Holly Smith, Executive Committee.

In accordance with the above resolution, the president appointed Drs. H. W. Morgan, M. W. Foster, Theo. Menges, C. N. Pierce and H. A. Smith.

LOUIS OTTOFY, Secretary.

Dr. Donnally: I move that the communication be received, the recommendation contained therein to be carried out, and committee appointed. Seconded and carried.

Dr. Henry Morgan: As chairman of the committee of the National Association of Faculties I desire to say that as soon as your committee is appointed, if you will notify us, we will meet you at any time that may be convenient.

(Dr. Morgan and the committee from the National Association of Faculties then withdrew.)

Dr. Clements: Are we to consider the resignation of the California Board as their final action? From what the secretary said I understood some members of the association had expressed a willingness to withdraw it, and if they have expressed a desire to return to the fold we could defer action on the matter and hear from them later; but if that is their final act we must accept their resignation.

Dr. Edwards: As I understand, we have their resignation presented, and we learn also that they desire to withdraw it. We must either accept the resignation or defer its consideration. I would move that it be deferred and we do not accept it. Have we accepted their resignation?

Dr. Meeker: We have not yet; it has not been acted upon.

Dr. Edwards: Do I understand that they have expressed a willingness to withdraw it?

Dr. Meeker: No; I said that just a short time before I received this communication I received a letter from them, coming back into the association and sending a check for their dues, and right afterwards I received this communication.

Dr. Moore: I do not think we have any right to do anything but accept it.

Dr. Donnally: I think if this matter is managed judiciously and wisely the California Board will come back, which is the desire of every man who wants to see the objects of this association carried out, and I think a little parley would be well; that we should take the pains to explain to them wherein they misapprehend the condition of things. I think if a friendly letter were written them in a good spirit they would try to come back in the fold. The same thing possibly would apply to other states, but I do not like to see a board go out with a statement that we cannot accept as true, or perhaps I should say, an interpretation of a condition that we do not recognize as a correct interpretation and I would not be willing, so far as I am concerned, to see this association accept the California Board's resignation and say nothing. We must, in defense of our position, and in defense of the fact, show them wherein they are in error, and in a kindly friendly way insist that they shall come in with us and continue with us, as we desire their advice and experience, and all that sort of thing.

Dr. Chappell: I think it would be proper if we referred this matter to a committee to report next year. It would be proper to refer it to the Executive Committee, if we have one, to consider the matter during the interim, and report next year. By that means there will be an opportunity for the California Board to withdraw their resignation.

Dr. Donnally: Suppose we table it for the present and bring it up later.

Dr. Meeker: I believe as Dr. Chappell does, that the reading of the articles that will appear in the magazines now, together with this resolution, which I have just read, from the Association of Dental Faculties, will make some difference in the feeling of California towards this association, because

Dr. Noble: I am inclined to think that it is always better to be overcourteous than otherwise. I think we had better notify them that we have appointed a committee and send them an official notice, so that they shall have it on record.

Dr. Meeker: I should do that without any motion.

Dr. Edwards: The chairman of the committee asked us to notify him individually, but our action was taken in his presence.

The President: Well, I will put the motion. It is moved and seconded that the secretary communicate with and notify them what action has been taken. Carried.

The President: With your permission I will bother you a little while. The president then read his address as follows:

PRESIDENT'S ADDRESS, BY DR. J. T. ABBOTT.

Another year has gone to join the innumerable, and we are once more permitted to greet friends and form new acquaintances. Change is the common lot of all, of everything. We all in the past year have had our peculiar experiences and individual changes. Rest is impossible, but I trust that we have assembled for the furtherance of the primary object of organization of this body viz, education. If it is not for that purpose, and if it has lost sight of that purpose, or ever shall lose sight of it, then it never has had any object and exists now only in name.

But in reviewing its acts, its efforts towards advancement to higher grounds, I believe much good has been accomplished and more is to follow. One very cheering aspect is the general assistance given by nearly all educators in dental educational departments, and this is as it should be. This organization has no personal schemes to put forth or hindrances to place in the path of advanced education.

One object it would like to see obtained—uniformity of education in different schools so far as may be obtained, that results might be interchangeable. In furtherance of this as well as other objects, the committee on colleges has been insistent in procuring information from all the dental colleges in the country; and to their credit be it said, the answers to questions have been almost uniformly courteous, kind and helpful. The object in all schools to be obtained is the same. Differences of opinion as to modes will necessarily arise, jealousies may exist in minds cramped and dwarfed, or even honestly overlooked individuals may let environment sway their better judgment, but the masses are eventually sure to be right and do right, and results will be all the most chronic kickers could have desired.

It is a fact patent to all that this organization has been the means of awakening many of the schools to a realization of their want in some directions, and said schools have been prompt to adopt measures that have resulted in placing them on a higher educational basis. We do not claim that we alone have been responsible for the good results. State, local and national societies have all been at work in the same direction, and the faculties have been most urgent in this direction; yet one great stimulus, one prominent, potent factor in this direction has been the persistent activity of the National Association of Dental Examiners.

And now, gentlemen, do we not see clearly before us our duty? Results should only stimulate us to renewed activity, continuing further the good and correcting any mistakes we may have made. All such organizations out of which we grew are comparatively of recent date, and in one sense experimental. We are not infallible, and court *honest*, helpful criticism from all who are interested and have the knowledge preparatory to criticism. I would ask all, and it is no informal request, whether members with us or interested members of other organizations, to "Come, let us reason together," that the results of accumulated experience may be a basis of future action.

At our last meeting a committee was appointed for the purpose of incorporating "The National Association of Dental Examiners." Said committee

has accomplished the same and Chairman H. B. Noble will make report of same. It has been said that aggrieved parties could not obtain redress—for imaginary wrongs—because this body was not incorporated. I trust said parties may now be relieved.

At our last session at Saratoga a committee was also appointed to codify "Rules and Conditions for the Obtaining and Maintaining Recognition of Dental Colleges by the National Association of Dental Examiners." Said committee made a report to this body, which report was unanimously adopted and generally commended by the faculties of colleges. Some, however, have seen fit to take exceptions to your action, and one has facetiously termed us "Beggars on Horseback." Honest criticism should always be courted. The position he occupies would lead you to expect courteous treatment, at least. I think, however, the reply by the chairman of the committee on colleges can be warmly seconded by this association.

This body is seeking no personal renown. We are a delegated body with delegated powers. Our constituents can modify, approve or disapprove our acts. The aim is to assist along educational lines. If we advance too fast, a halt can be called for the loiterers to come up.

I would suggest the propriety of a permanent joint committee (appointed or elected) of the National Association of Dental Examiners and National Association of College Faculties, to which can be referred all subjects or questions vital to both organizations. The National Association of Dental Examiners after almost exhaustive examinations have assumed the power of pronouncing upon the standing of the dental colleges, and the large majority of state boards acknowledge their standard. The results of this course has proved satisfactory and successful. The committee on colleges have obtained information through the deans and secretaries which enables you to act understandingly, so that no unworthy school may obtain recognition and justice may be meted out to the worthy.

The above power should of necessity be delegated to some body, some responsible organization. If left to each state, instead of uniformity we should drift farther and farther apart. The original thirteen states, acting upon this principle, formed a union for the safer and better government of the whole. Experience in many directions, not necessary even to point them out, has proved the wisdom of such action. "In union there is strength." If this body is not sufficient for the demands, then it should be made so, or dissolved and some body organized that is sufficient. But this organization, delegated from those state bodies who have the power, seems to me to contain all the essential elements necessary to act for the whole.

And now, gentlemen, believing this body fully competent to act for the whole understandingly and having the power to act, we should grasp all questions which may come before us with a determination to act for the best interests of the whole, and act fearlessly but with judgment. Probably questions of vital importance will come before us during this meeting.

The California State Board of Dental Examiners has seen fit to notify this body of their withdrawal. We have had experiences of withdrawal of states from the union compact. The results were not altogether satisfactory. This compact, however, is not bound by any written code or written acknowledgement of parties thereto. If my memory serves me right, it took years for one of the thirteen original states to acknowledge the constitution.

I am clearly of the opinion that all differences will be adjusted on lines satisfactory to all parties. We come together with this object in view and towards this end we must work. Last year I took the liberty to suggest some improvements. Allow me to call your attention to the same in so far as they have not been consummated.

Gentlemen, I thank you for your kind consideration shown me in the past, and with your forbearance will try to merit a continuance of the same.

Dr. Chappell: I move that a vote of thanks be tendered to our president for his address.

Vice-President Noble put the above motion, which had been seconded by several members, and the same was carried unanimously by a rising vote.

The President: Thank you all, gentlemen.

On motion a recess was taken until 3 o'clock p. m.

AFTERNOON SESSION, JULY 30.

President Abbott called the meeting to order. Secretary Meeker called the roll and read the minutes of the morning meeting, which were approved as read.

The President: Dr. Donnally, has your committee been in session with the committee from the faculties?

Dr. Donnally: No, sir, we have had a little conference among ourselves. We wanted a little more information and a little better understanding among ourselves before we held the meeting. If possible we should like to have a report of the committee on colleges before we meet.

The President: I was going to suggest that we had better hear the report of the committee on colleges while you are present. But first I will state that I have a communication here which I will ask the secretary to read.

Secretary Meeker then read the resignation of Dr. L. Ashley Faught as chairman of the committee on colleges, the resignation being as follows:

Philadelphia, July 29, 1897.

Dr. J. T. Abbott, President N. A. D. E.

Dear Doctor: Inasmuch as my membership in the Pennsylvania State Board of Dental Examiners expired at its last session, held this month, I hereby tender to you my resignation as chairman of the committee on colleges of this N. A. D. E. Sincerely yours, L. ASHLEY FAUGHT.

The President: That resignation will take effect at the close of this meeting if accepted. What action will you take at present.

Dr. Donnally: The gentleman no doubt has a great deal of data and has gained much information during the year, and I suppose that he will at least favor us with the substance of what he has done, even if he cannot give us a full and detailed report.

Dr. Faught: My resignation, as you will see, is dated yesterday. It was my full intention, before coming here, to present it. The point is perfectly plain—that a man who is not a full member of his board, while undoubtedly a member of this association, cannot continue to act in an official capacity, and I think it is perfectly proper for me to tender this resignation at this time. Of course you can fix your own time at which it shall take effect; I am here to render you all the service possible.

It was moved, seconded and carried that the resignation of Dr. Faught be laid on the table pending the reading of the report of the committee on colleges.

Dr. Faught: I will say before beginning to read this report, that there are copies here of the various documents that have been in use during the year, especially the rules. I thought the members might possibly like to have some of them in their possession during the reading of the report, so I brought some for that purpose.

Dr. Faught then presented the following report from the committee on colleges.

REPORT OF THE COMMITTEE ON COLLEGES.

Mr. President and Gentlemen:

The committee on colleges would respectfully submit the following report:

The year 1897 has been one in which the work of this office has become thoroughly systematized and placed upon a good working basis. Files have been established for the preservation of the documents relating to the various schools, the numbers upon each corresponding to the number upon the

catalogue of the school. Correspondence has been thoroughly established with all the schools and with the representatives of the various state boards. We have thus during the year been in thorough touch with those representing the dental educational interests throughout the United States. Our information, therefore, is of the most practical and tangible character and has enabled us to do our work with confidence and to place the association in possession of a fund of knowledge not only for use in the future but also to be used retrospectively, with a surety of finding what have been our past actions and decisions.

Your committee on colleges has issued in printed form "Rules and Conditions for Obtaining and Maintaining Recognition of Dental Colleges," as codified by this body last year, and has sent copies to all the colleges and to various state boards, so that they might be officially informed thereof.

In accordance with rule 1, proper blanks for making application were prepared and issued. These blanks have been found to be of immense value, for certified to as they are by the dean of the college making the application, and also by a representative of the board of the state within whose territory the college is located, after due examination of the correctness of the matter in them, we are thus furnished with positive data, not only upon which to make decisions as to the status of any institution in question, but also to remain as constant evidence of that upon which such action was based.

Your committee has also issued a printed list of the recognized colleges. In accordance with rule 4, we sent out a proper blank for the annual report of each state board to this association. In the practical application of the rules and conditions we early found the necessity of making the following decisions, and would take this opportunity of suggesting further necessary changes.

Regarding rule 1, owing to somewhat tautological and obscure wording, it was necessary in many instances to formally state that the requirement to fill out and return the blank applied only to colleges not now on the list of those recognized—that is, to those not on it prior to January 1, 1897. We would suggest that rule 1 should now be changed to read as follows, as more definitely in harmony with the purposes of our association:

RULES AND CONDITIONS.

Rule 1. Colleges desiring recognition by the National Association of Dental Examiners shall make application for such recognition through the committee on colleges on blanks provided for that purpose.

Your committee found it necessary in issuing a copy of rules to the colleges to make a total suspension of rule 2, for the reason that we found it difficult to determine how "the prominent local educators were to be remunerated." In making this suspension, however, we invited the faculties of the various colleges to communicate to us their ideas as to the practicability of enforcing this rule, and have received in reply many very interesting communications, the consensus of which is an opinion that while our rule was a good one, and if it were possible to enforce the same would materially tend to elevate the standard of the profession, and that while a great many of the institutions agreed to its requirements, a still larger number seem to feel the impossibility of its enforcement at the present time. As these opinions concur with the one previously formed by your committee, we now recommend that this rule, as codified at Saratoga, be stricken out and the following substituted: Rule 2. The preliminary requirements prescribed by the National Association of Dental Faculties shall be the standard accepted and required by the National Association of Dental Examiners.

As previously stated in this report, rule 3 has stood a test of usefulness and we therefore recommend its continuance, viz: Rule 3. The statements set forth in the application of any college for recognition shall be verified, after investigation, by the board of dental examiners of the state in which

the college is located, or by other persons designated by the National Association of Dental Examiners, in case no such state board exists, and the recommendation of such board shall be essential to recognition.

As we find no occasion for the last clause in rule 4, and as we believe the National Association of Dental Examiners capable of dealing with the contingency therein provided for, without stating specifically our action in advance, we recommend that rule 4 be amended so as to read as follows:

Rule 4. The state boards in connection with this association are hereby required to become informed of the character of the dental colleges located in their respective states, as to their equipment, facilities and methods of teaching, and shall report annually to this association wherein they fail to comply with these requirements.

As no reason exists to necessitate our association going back of the requirements of the laws of the different states, they being specific as to age requirement, we therefore recommend that rule 5 be amended by striking out the last clause so that it shall read as follows:

Rule 5. Attendance of students upon three full courses, of not less than six months duration each, in separate years, with three months' practical instruction intervening between the courses, shall be required before final examination for graduation.

Your committee has made the interpretation that this rule was complied with as touching the three months' practical instruction between courses, when colleges were able to certify to it—that is, when the instructors actually knew that the students took this time with their preceptors, or afforded them this amount of care and attention during the interval at the college building. Your committee also interpreted that "six months duration each" meant calendar months—lectures from October 1 to April 1.

We also found it necessary to early suspend rule 6 for the reason that the committee on colleges believes that recognition should be based, not upon the number of professors composing a faculty, but upon the efficiency of the methods of instruction, maintaining however, that there is a minimum number of professors below which efficiency must necessarily fail, and suggests that number be six. Your committee also interpreted that it is arbitrary to insist upon a division into four dental and six medical subjects, to be covered arbitrarily by three dental and five medical professors—believing the subjects as a rule may be covered either by dental or medical professors, as may make more convenient combinations to any college in question. We interpreted, however, that the ten subjects as specified should be covered. We therefore recommend that rule 6 be amended so as to read—

Rule 6. Each dental college to be on the list of recognized colleges should have a teaching faculty composed of at least six individuals, and teach the following branches: Operative dentistry, dental prosthetics, dental pathology and oral surgery; also the six branches of anatomy, physiology, chemistry, general pathology (fundamentals), *materia medica* and therapeutics and general surgery. Their students must also be taught the subjects of chemistry and bacteriology in laboratories adapted to the purpose and under suitable instructors. That such special college must possess in addition to suitable lecture rooms, a well-appointed dental infirmary and a general prosthetic laboratory, also each college must be provided with facilities suitable for manual training in operative dentistry, and must furnish in this way systematic instruction to its students.

Your committee would recommend the striking out *in toto* of the rules numbered 7, 8 and 9; and would further suggest that rule 10 be now made rule 7.

Rule 7. These rules and conditions shall apply to all colleges, including those now on the recognized list, as well as to those making application for such recognition.

We would report that we have had the most hearty cooperation of the various state boards in the conduct of our work, and the most overwhelming evidence of the value of the National Association of Dental Examiners to the individual boards. Numberless have been the times that information concerning the colleges has been sought at our hands; and promptly, correctly and confidently have we found ourselves able to supply the desired information. Standing as your committee does in daily communication with every state in the union through the double touch with colleges and boards, it becomes a great gatherer of up-to-date information, which it can freely place at any instant at the disposal of any board. Indeed, so large has become the clerical work of your committee that its chairman frankly confesses that he would have been unable to maintain efficiency of service were it not that he has been fortunate enough to possess the assistance of a trained secretary, who having become conversant with the detail of the work has afforded the greatest advantage in bearing the burden.

The reports from the various state boards, on the blanks furnished according to rule 4, are in the hands of your committee, and will as they come in from year to year constitute a valuable file of more than hearsay information. Especial mention and acknowledgment is here to be made to the state boards of Illinois and Kansas for the material assistance they have given your committee regarding Missouri, which was assigned to them by reason of that state not having at that time a board of dental examiners.

The question has arisen as to state boards registering applicants holding diplomas issued by a school prior to being placed in the recognized list of this association; and the concurrent question as to whether a diploma, issued by a college before it was recognized by this association, entitled the holder to an examination before a state board which accepted the list of the national association as the official list of its state. In reply to this question, your committee realizing that graduates from colleges other than those on the recognized list could not be examined by the boards who use the national list as the standard of their states, nor could they be registered in states where the same list was the accepted standard, have stated that each state board must settle the question for itself and in accordance with its state laws. It being however manifestly improper for a state board, which has in the past accepted the list of the national association as the official list of its state, to examine the holder of a diploma issued by a college before it was recognized by the national association or to grant him registration. We would now, however, suggest as the proper solution of both problems that the date of recognition of any institution be placed on the list issued by this association; and that the question of the eligibility of the candidate for registration or for examination be left for each state board to determine for itself.

The National Association of Dental Examiners has during the last year, and particularly during the last few months, through the medium of two editorials written by college professors, been stigmatized as assuming and making "an unwarrantable and impertinent interference with the chartered rights and functions of dental educational institutions." This charge can have no other basis than the fact that this association has shown a strong desire to cause a high preliminary standard of education to become an established essential to a collegiate course of study in dentistry. History repeats itself. The early practitioners of dentistry, feeling the need of broad professional culture, made overtures to those whose chartered rights invested them with authority to give it. The little band was then insultingly spurned from the doors of medical colleges. They accepted the issue forced upon them by those who thus failed to appreciate their duty—literature, colleges, a degree and a profession was the result. Then, and only then, did medical men want it understood that dentistry was a specialty in medicine. In exactly the same way has the question of preliminary education become an issue forced upon the boards of examiners. They have watched for years the

pretense upon the part of some colleges to require a high standard for entrance from the men coming to the college doors; and yet when the finished product of these institutions has been handed over to us we have felt that these standards in too many instances existed only on paper.

We have protested without avail, and at last have felt that the salvation of the profession demanded that something be done, and we have with reluctance taken up the issue forced upon us.

We believe the question of a high preliminary standard to be the paramount issue of the day. We see it steadily advancing in other educational institutions, and we believe that in dentistry it must become the established fact of the future.

One of the most prominent reasons for the establishment of state laws in dentistry is the protection of the profession, yet we cannot fail to recognize that these very laws have proven two-edged, and in a measure become the protection of a class of practitioners which they were expected to exclude. The man of low education, lacking the polish and sentiment of a highly educated gentleman, lured by the supposed large emoluments of comparatively easy attainment, enters a college, secures his degree, passes a state board, acquires his license, and enters upon practice on a plane in keeping with his original educational development, and having the same license hung in his office as that exhibited by his brother of more extended culture and professional honor. A public discriminating only on the basis of cost gives to this quackery a successful patronage, and thus aids these men in lowering and degrading the professional status. A high preliminary education starts those only on a professional career who have that polish which is extremely unlikely to eventuate in anything but a high character of professional practice. The claim that the requirement of a high preliminary standard of education will work hardship by debarring many deserving young men is to be met by the fact of experience that anyone really possessing the true metal necessary to practice dentistry will always develop the true grit necessary to acquire the preliminary essential.

We consider the keynote to the present situation and the real object of this association to be the establishment of a correct list of colleges who educate up to the standard demanded by the needs of the profession. The list to be used by the various state boards as a guide in their local work. The idea of each state being able to compile a correct list of such colleges is too absurd for discussion. The illegality of this association doing that work for its component parts is also too far-fetched for consideration. Of course the right of any state board to accept or to reject the list lies entirely with itself, as does also membership in this organization. Those of us, however, who know and realize these features and who are willing to abide by the rules of this organization, recognize that our strength as an organization is to be limited only by the degree of unity with which state boards stand together.

L. ASHLEY FAUGHT, Chairman.

G. CARLETON BROWN.

The President: This report is before you. What action will you take? On motion the report was accepted.

Dr. Parmele: Do I understand that is the full report?

Dr. Faught: No, we have a specific report concerning colleges, which will come in later.

Dr. Chappell: It will be necessary to have a motion made to refer that report to a committee on codification.

Dr. Parmele: I understand we have not adopted the report but only accepted it.

The President: You have only accepted it; it is in your hands for action. I suggest that a committee be appointed for making a division of the report and considering what action we will take after understanding it thoroughly. Rule 1, 2, 4, 6, 8, 9 and 10 should be acted upon, if I am correct in my recol-

lection. Perhaps one committee would not have time to cover all of them in their various phases.

Dr. Chappell: There are some very important matters in the report, which it seems to me should go to the committee on conference; something that will modify the feelings of our brothers wonderfully. I think the committee should have access to that report after it has passed the committee of revision, or that the committee on colleges be requested or required to present those resolutions in proper shape so that we can adopt them before we have final action by the conference committee.

Dr. Moore: I think these are very important modifications, and so far as they have been read I see nothing but what I would support; at the same time I think this association should look over the matter carefully. We ought to get at these and put them in shape as soon as possible, for I do think they would have the effect of very largely modifying the faculties committee in their action.

Dr. Meeker: I move that we take up rule 1 and go right along with them as a committee of the whole.

Dr. Edwards: Yes, I was about to make that suggestion, that they be read now and passed upon. I second the motion.

Dr. Donnally: I think the best immediate use that could be made of this report is suggested by Dr. Chappell, that it should go to the committee on conference, and that we could use it or so much of it as we think would be of service in meeting the alleged differences between the Association of Faculties and ourselves.

The President: There was a motion made and seconded that the different recommendations be taken up and passed upon at once.

Dr. Donnally: It seems to me that before any final action is taken, or any codification had, we should have a report from the committee on conference. There are some matters we might get in good shape. I think we may have concessions greater than the chairman of the committee on colleges asks for. For instance, one of the suggestions applies to colleges, and I think that six professors are not enough, and that no college should be organized or conducted with less than seven. There are possibly one or two other points that we could recommend to them which might avoid an interference with the vested rights of colleges, and for that reason I would oppose a motion to take up the matter now and dispose of it finally, but prefer to see the association turn it over for the use of this committee for the present, and make it the special order of business for 10 o'clock to-morrow.

Dr. Moore: At present it is merely a matter of report; the association does not know if we are going to adopt the recommendations or not. If the committee on conference takes those recommendations with the approval of this meeting, they may then come back and we could make some modifications if they asked for them. It seems to me the proper course is to go over this now, so that the committee on conference can have the backing of this association as to these modifications.

Dr. Chappell: My idea of referring this to a committee was, that while such committee was at work we could have a conference with the faculties committee and refer whatever disturbing element we find to our association, and have it referred to a committee. But we ought to have some further information and get together before we act on the report of the committee on colleges.

Dr. King: It seems to me these modifications should be taken up so that we can present our views on the subject, and I think the report should remain the property of this board before any committee takes hold of it.

Dr. Brown: I do not see how any committee is going to take charge of the work in that way. We are here to do this work; let us get these recommendations in shape and turn them over to the conference committee so that they will have something to work on. That committee cannot go to the

other association now and use them, because at present they are only under consideration. No one has even expressed an opinion as being in harmony with any of the propositions.

The motion of Dr. Meeker that the meeting take up the recommendations of the committee on colleges, as a committee of the whole, was then put by the president and carried.

The President: The chairman of the committee will please read recommendation No. 1.

Dr. Moore: Before that is done I want to make a report from the committee on credentials. H. W. Campbell, representing the Virginia State Board, has presented his credentials, which we have received, and he is present.

Dr. Faught: Before taking up the proposed new rule I will read the rule which was codified last year. It is as follows: 1. A formal application for recognition shall be made by January 1, 1897, by each college now organized desiring such recognition; and colleges hereafter organized shall make such application within the three months next succeeding their organization. All such applications shall be made upon blanks to be obtained from the committee on colleges of this association, and shall answer in full all the questions contained in the same.

The modifications which we suggest are based upon the following facts: In the first place, there are some colleges in existence that have not made any application to us at all, and they have been a good deal longer than three months in existence now. What is the use of our making such a statement in the rule? We have no authority to exclude them simply because they do not take action, so that seems to be a very useless clause. Originally it was thought well to force the colleges to place themselves under our recognition or espionage so that we might know something about them, but many of them have not done it, and I do not think that portion of the old rule has any force whatever. We make ourselves ridiculous by asking something that we cannot positively require, and the suggestions which the committee on colleges have made are entirely on that idea—that we should not ask a thing which was not strictly within our province, so that we could then stand by our rule and have some foundation on which to build. So we suggest leaving out that clause regarding application within the next three months succeeding, etc. As we have amended it reads thus: "Rule 1. Colleges desiring recognition by the National Association of Dental Examiners shall make application for such recognition through the committee on colleges on blanks furnished for that purpose."

Dr. Donnally: Would it not be better to say "may make"?

Dr. Faught: In the experience of the last year or so, particularly during the last year, there has not been a college that has made application on its own paper as the old applications used to be—"we make application for recognition by the National Association of Dental Examiners," which was signed by the dean only. Not one of them has objected to asking for our blanks, accepting and filling them out fully. Where they have not done it correctly in the first place and we have returned it and suggested that it was not full and explicit, the college has done everything to make it so. If we use the words "may make" you take away from the committee on colleges the foundation on which to make its decision, provided the college should object or fail to fill out the blanks; we would have nothing then to act upon except hearsay evidence, which we have been charged with acting upon, but which we do not act upon, for we rely only on definite statements.

It was moved, seconded and carried that rule 1, as recommended by the committee on colleges, be adopted.

Dr. Faught: Rule 2 as codified last year is as follows: "2. The preliminary requirements prescribed by the National Association of Dental Faculties must be accepted and carried out in good faith by the colleges recognized by

the National Association of Dental Examiners, provided that the standard adopted by the National Association of Dental Faculties at Saratoga in 1896 be not lowered. Where such *certificate*, as thus required, cannot be presented from state school authorities by the applicant for matriculation, his or her qualifications shall be tested by an examination, conducted according to this standard by prominent local educators, approved by a state board of dental examiners for that purpose. None of the persons thus conducting the preliminary examination shall be members of the faculty of the college to which the application has been made."

That is a pretty broad rule and we immediately found difficulty with it. We had not adjourned two hours before we began to get into trouble, and by the 1st of September our committee had decided we had better go very slowly on that rule, so that when the printed rules were issued, sometime during September, we "starred" that rule and put down at the bottom a note that, "this rule being a radical change, the committee on colleges does not intend to require it this year." In sending out the rules we wrote letters to all the deans in which we told them they would observe we had "starred" the rule, and wished to have their colleges express to us the opinion of their faculty as to the possibility of enforcing that rule. We received many letters and the majority of them were very much in favor of the rule, but believed in the impossibility of enforcing it at this time, and we could not understand how the "prominent educators" were in any way going to be re-enumerated. So we made the modification which we present to you as a suggestion of the committee, and it is as follows: "Rule 2. The preliminary requirements prescribed by the National Association of Dental Faculties shall be the standard accepted and required by the National Association of Dental Examiners."

Dr. Moore: I move the adoption of this rule.

Dr. Donnally: I understand that rule is not in force now. Is it?

Dr. Faught: I am very glad Dr. Donnally asked that question. I left that out of the original statement, because I did not wish to bring up so much at once, preferring to let you ask for information as you desired it. The fact is, we do not know what the standard is, which has been one thing that has paralyzed this committee in its work all through the year.

We have here the announcements of the colleges for 1897-8. One of them is as follows: "Notice is hereby given that these requirements, affecting those who wish to enter for the session of 1897-8, may be changed or modified by the action of the National Association of Dental Examiners in August, 1897, in which case the faculty of this college reserves the right to alter the following regulations without further notice, and the dean is not to be held accountable for any written communication before that date in case of any change."

(To be continued.)

News Summary.

DR. J. L. RIGGS, of Pawnee City, Neb., died August 4 with typhoid fever, after a two weeks' illness.

ANY dentist will be benefited by sending for the new catalogue of the Mason Detachable Tooth Company.

PUMICE MIXED WITH SOAP.—To prevent pumice flying on one's dress while polishing, mix some soap in water until a foam is produced, then add the pumice to it, and dab the mixture on the denture which is being polished with a soft brush.—*W. H. Wilshire.*

DR. J. Y. CRAWFORD "did not care what name it had if they would only put American or United States in it to show to what country it belonged."

SOFT RUBBER FOR LINING DENTURES.—After trimming the rubber with a hot knife there is a certain amount of stickiness about it, which can be removed by rubbing over the rubber with a clean, soft rag dipped in paraffin oil.—*H. W. Moore.*

WHERE WAS HE?—The *Dental Review* says "It was hot as Hades during the meetings at Old Point." The generally expressed opinion was, that those in attendance were blessed with delightfully cool weather, and we would suggest that the author of the above remark must have struck only the hot places.

ACCIDENTS DURING THE MEETINGS.—Two accidents occurred, but happily neither one resulted seriously. Dr. James Truman, president of the American, pushed his chair, while sitting in it, off the platform. He was bruised and severely shaken up, but was able to preside over the meetings. Dr. J. J. Sarazen, of New Orleans, was taken with cramps while in swimming. He was going down for the third time when Dr. T. C. Wilson, of Savannah, Ga., who was sitting on the hotel piazza, jumped in and rescued him. The Southern Dental Association passed resolutions commanding Dr. Wilson.

SULPHATE OF SODIUM AS A HEMOSTATIC.—In the *Revue Medicate de la Suisse Romande* of January 20, 1897, Reverdin contributes an interesting article upon this subject, experimental and otherwise, and concludes that small doses of sulphate of sodium (two grains every hour) are of great value in certain cases of capillary hemorrhage for the purpose of arresting the flow of blood. He has also found this method of treatment of value for the control of graver hemorrhages. His experiments upon animals seem to show, however, that the remedy is of value only if given by the stomach or injected into the veins. Under these circumstances it distinctly increases the coagulability of the blood. On the other hand, it is a noteworthy fact that its administration subcutaneously does not produce the same result.

LEUCOCYTES AND THE BACTERICIDAL ACTION OF THE BLOOD.—Hahn (Arch. f. Hyg., vol. xxv, p. 105) has investigated the action of blood serum and also the pleural exudation of rabbits. The leucocytes in the latter are destroyed by freezing. He found that the exudate had a more powerful bactericidal action upon *staphylococcus pyogenes aureus* and *bacillus typhosis* than the blood serum or the defribinated blood of the same animal; and since the leucocytes were destroyed, the action cannot depend upon phagocytosis in Metchnikoff's sense of the term. The author made experiments with Lichenfeld's histin-blood, in which the leucocytes remained unaffected, in order to determine whether the bactericidal power depends upon the destruction of leucocytes or upon substances secreted by the leucocytes while still alive. He came to the conclusion that the latter is the more probable explanation.

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	Sulphate of Atropine.....	gr. 1-200
	Sterilized water.....	gtts. xxx

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